NEWNES'
PICTORIAL KNOWLEDGE

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Specially painted for this work.

A HOME ON A RAFT OF LOGS

Most of the nations on the Continent of Europe make far more use of canals and inland waterways than is the case in this country. Holland and Germany are particularly rich in canals, along which heavy cargoes are dispatched for hundreds of miles. In this picture, for example, we see a canal in East Prussia. A raft of timber is being floated from the forest to a manufacturing district; and, so long does the journey take, the man in charge erects upon the raft a straw hut for himself, his wife and family. Such a hut may be their home for several weeks.

NEWNES'
PICTORIAL KNOWLEDGE

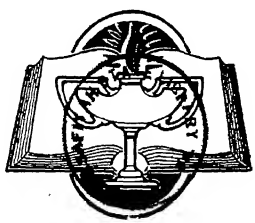
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1173

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CONTENTS OF VOLUME FOUR

PAGE

THE STORY OF THE WORLD AND ITS PEOPLES—
OUR NEIGHBOURS AND FRIENDS IN OTHER LANDS

France 1
A Trip in a Tramp 11
The Land of the Norsemen 37
Switzerland, the Playground of Europe 51
The Rhine and the Rhineland 59
From Black Sea to Black Forest 75
Russia: U.S.S.R. in Europe and Asia 97
Through the Blue Mediterranean 113

THE STORY OF THE WORLD AND ITS PEOPLES—
ANCIENT LANDS OF THE DESERT AND THE SANDSTORM

The Holy Land 157
Egypt: and the Nile 175
The Land of Mesopotamia 182

A CHILDREN'S TREASURY OF VERSE
LITTLE MASTERPIECES OF TO-DAY AND YESTERDAY

The Lake Isle of Innisfree. W. B. Yeats 187
Big Steamers. Rudyard Kipling 188
I Know a Bank. William Shakespeare 188
The Gardener. Robert Louis Stevenson 189
The Fairies. William Allingham 190
A March Day. William Wordsworth 190
Cargoes. John Masefield 191
Seven Years Old. Jean Ingelow 192
The Vowels. Jonathan Swift 192
The Cat and the Broom. A. A. Kenny 193
Someone. Walter De La Mare 193

PAGE

A CHILDREN'S TREASURY OF VERSE

LITTLE MASTERPIECES OF TO-DAY AND YESTERDAY (Contd.)

THE NAUGHTY BOY. John Keats 194
WHO IS IT? Enid Blyton 195
THE FAIRIES' SONG. William Shakespeare 196
SIGNS OF RAIN. Edward Jenner 197
ENGLAND. William Shakespeare 198
TO THE LADY-BIRD. Anon. 198
THE THRUSH'S NEST. John Clare 198
SPRING. Thomas Nash 199
CRAB-APPLE. Ethel Talbot 200
THE DOVE. John Keats 200
THE BEGGAR MAID. Tennyson 201
RABBIT-SONG. Enid Blyton 202
WINTER. William Shakespeare 203
THE ELFIN ARTIST. Alfred Noyes 204
HOME-THOUGHTS FROM ABROAD. Robert Browning 205
FIRST SPRING MORNING—A CHILD'S POEM. Robert Bridges . . . 206
THE OWL. Tennyson 206
WHO HAS SEEN THE WIND? Christina Rossetti 207
THE WIND IN A FROLIC. William Howitt 208
THE LUCKY DUCKS. Enid Blyton 209
THERE WAS AN OLD WOMAN. Anon 210
DRAKE'S DRUM. Henry Newbolt 211
EARL HALDAN'S DAUGHTER. Charles Kingsley 212
WATER JEWELS. Mrs. M. I. Butts 212
THE OWL AND THE PUSSY-CAT. Edward Lear 213
MR. NOBODY. Anon 214
MORNING. Robert Browning 214
GOBLINS' LANTERNS. Marion St. John Webb 215
A FAIRY WENT A-MARKETING. Rose Fyleman 216
FOUR DUCKS. William Allingham 216
THE FIRST WILD ROSE. Enid Blyton 217
OLD SHELLOVER. Walter De La Mare 217
THE ELF AND THE DORMOUSE. Oliver Herford 218
THE MOUNTAIN AND THE SQUIRREL. Ralph Waldo Emerson. . . . 218

PAGE

FAVOURITE HOBBIES : PASTIMES AT HOME AND AWAY FROM HOME—COLLECTIONS : HOW TO BEGIN—AND AFTERWARDS

COLLECTING WITH THE CAMERA 219
BUTTERFLIES AND MOTHS 229
STAMP COLLECTING 239
COINS : A FASCINATING HOBBY 255

FAVOURITE HOBBIES : ANIMALS AND BIRDS ; HOW TO MANAGE THEM. FOUR-FOOTED AND OTHER FRIENDS IN THE HOME

PETS FOR BOYS AND GIRLS 273

FAVOURITE HOBBIES : THINGS TO MAKE AND DO—MODELS AND MODEL-MAKING

A 14-INCH SPAN GLIDER 289
A 21-INCH SPAN RUBBER-DRIVEN AEROPLANE 293
A 36-INCH SPAN TOW-LAUNCHED GLIDER 299
A HIGH-WING CABIN MONOPLANE 304
MODEL RAILWAYS AND SHIPS 310
KITES AND HOW TO MAKE THEM 316
WORKING SAND MODELS 318
MODEL SHIPS YOU CAN MAKE 323
A SIMPLE ELECTRIC MOTOR. 327
BOATS AND BOAT BUILDING 330
MAKING A MINIATURE ROAD CRANE 336

FAVOURITE HOBBIES—THINGS TO MAKE AND DO—HANDCRAFTS OF MANY KINDS

HANDCRAFTS 339
BEAD THREADING 340
RAFFIA WINDING 340
WOOL WEAVING ON CANVAS 341
WOOLLY BALLS 341
PLAITED RAFFIA. 343
SEWING 344
FRAME KNITTING 344
WEAVING ON A FRAME 347
INDIAN BASKETRY 350
CANE BASKET WEAVING 355
KNITTING 359
CROCHET 364
POTTERY 366
PLAIN NEEDLEWORK 369
EMBROIDERY STITCHES 377

PAGE

THE STORY OF THE HUMAN BODY—
A MARVELLOUS MACHINE AND WHAT IT DOES

How the Body Works 381
Your Nervous System 399
First Aid in Accident or Illness 404

Colour Plates

A Home on a Raft of Logs . . . . . *Frontispiece*
The Grandeur of a Norwegian Fjord . . . . . *Facing* 48
Through the Streets of Granada . . . . . „ 116
A Gaily-Coloured Street in Cairo . . . . . „ 184
The Fairies' Song . . . . . „ 196
Some Common British Moths . . . . . „ 232
A British Air Liner . . . . . „ 292
Model Ships You Can Make . . . . . „ 324

Photo-tone Supplements

Climbers of the Alps . . . . . *Between* 80-81
A Peep at the Holy Land . . . . . „ 160-161
Treasures of the Past . . . . . „ 256-257



F. Dannhäuser Walther.

WOMEN OF BRITTANY

Due south of the Channel Islands, and projecting out to sea, Brittany is one of the most attractive regions in France. At one time an independent duchy, it was taken over by France in 1547, and is now divided into five departments. The people of Brittany have preserved many of their ancient customs, and in the south the old Breton tongue is still spoken.

FRANCE

FRANCE is the nearest of all our neighbours, and it is to France that most of us go when we first set foot upon the mainland of Europe.

For five years between 1940 and 1945 France was occupied by the armed forces of Germany and all communication with countries outside German control was cut off.

Then slowly the country was liberated from the grip of the conqueror. In the process, some of her towns and villages in the Northern part of the country were devastated. Yet Paris, the capital, suffered remarkably little. Neither in its conquest nor liberation was it subject to the bombardments which other capitals of Europe suffered.

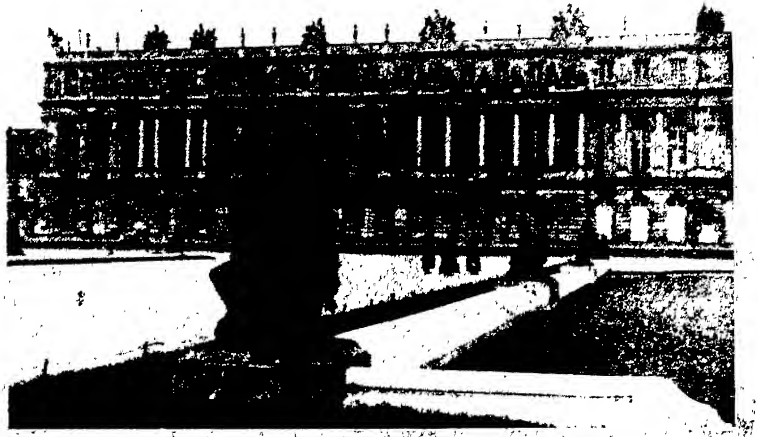
The Germans had marched into an open city as proud conquerors without fighting; they withdrew as a ragged horde when the forces of the Resistance movement rose and drove the enemy out piecemeal in four days. A French armoured force entered the city and Paris was free again.

Since then France, with the rest of Europe, has suffered the aftermath which a long war inevitably brings. But as time has passed, the work of reconstruction has gone on. Paris is again the gay city—not quite so gay as she was before the tragedy of 1940 fell upon her, but smiling again and once more the city of light and of fashion.

The City of Light.

To explore Paris thoroughly would take us years, for she has always new things to tell and old secrets to reveal. We notice from the very first how different the streets are from ours—the tree-lined boulevards, the busy cafés, where all Paris seems to meet in the

WHERE HISTORY HAS BEEN WRITTEN



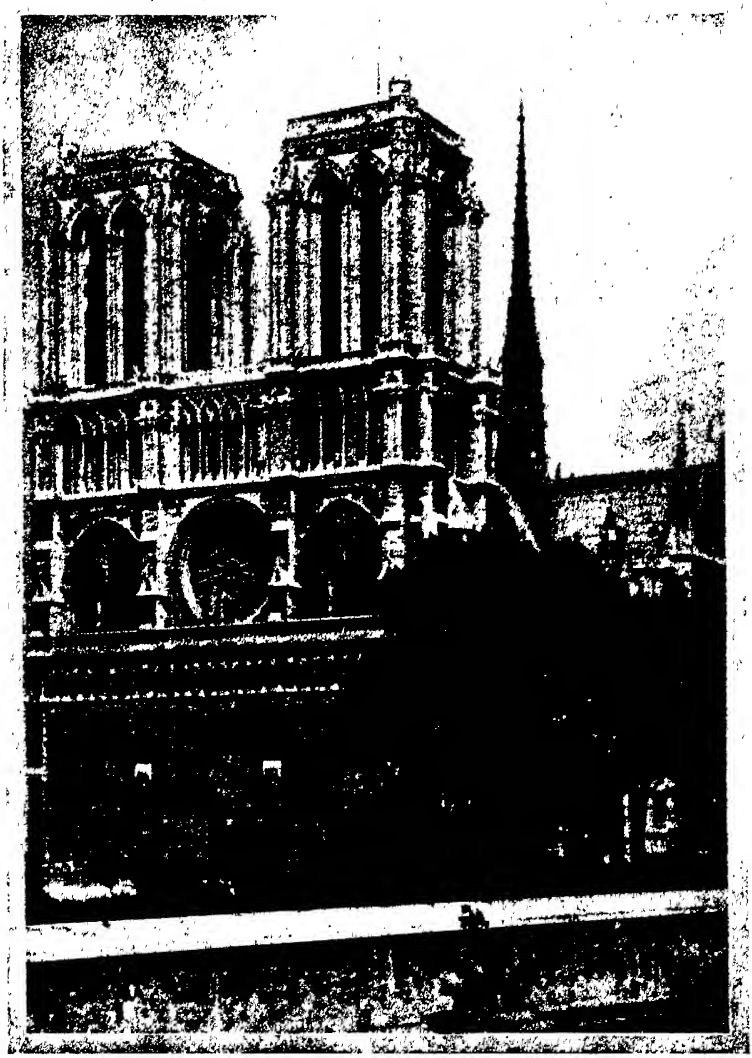
One of the most interesting buildings in Europe, if not in the world, the Palace of Versailles was built by Louis XIV in 1661–1683. Here in 1871 was signed the Peace Treaty at the conclusion of the Franco-Prussian War; and, in 1919, the Peace Treaty after the War of 1914–18.



Photos: Will F. Taylor.

The Palace of Fontainebleau, which stands some thirty-seven miles S.E. of Paris, was the favourite residence of Napoleon I. There has been a palace on this site since the tenth century.

NOTRE DAME DE PARIS



Keystone View Co.

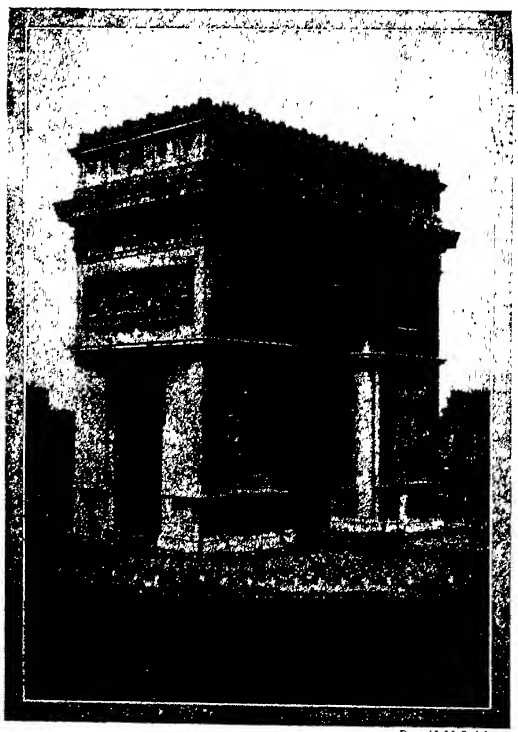
Work upon the building of Notre Dame, the great cathedral of Paris, was begun in 1163, and was not completed until the fourteenth century. One of the best examples of Gothic architecture, it is decorated with some magnificent stonework and stained glass. Notre Dame is 390 feet in length, and the two towers stand 226 feet high. Around the cathedral, Victor Hugo, the French novelist, wove his mediæval romance, "Notre Dame de Paris."

evening, the tall houses in which most people live in flats or apartments rather than in little houses in the suburbs like the Londoners, and the hurrying traffic which bothers us a bit when we cross the road, because it keeps to the right and not to the left as in England.

The oldest part of Paris—"the City"—is on an island in the Seine, which is bordered by clean stone quays and embankments and crossed by many beautiful bridges. On this island stand the great cathedral of Notre Dame, and the Palace of Justice, which once upon a time was the palace of the former kings of France.

How Paris Grew.

From this island, Old Paris spread to the banks, and you can trace the growth of the city through the ages by the successive "rings" of boulevards made along the lines of the old fortifications. On the right bank is the busiest part of the city, where we can see the Palace of the Louvre, which to-day is the "National Gallery" of France, the site of the old palace of the Tuileries, burned in 1871, in its lovely gardens, the Elysée, where the President lives, and the theatres and great *magasins* or shops. Paris has no great parks within its boundaries as London has, but its fine squares are among the best in Europe. From the Place de la Concorde, one of these squares, the splendid avenue of the Champs Elysées leads up to the Arc de Triomphe—a great triumphal arch which was set up to commemorate Napoleon's victories, and which to-day shelters beneath its mighty arch the tomb of France's Unknown Soldier. Napoleon himself, and Foch, the great general of France in the war of 1914–18, sleep beneath the golden dome of the Invalides.



Donald McLeish.

A MASSIVE "ARCH OF TRIUMPH"

The "Arc de Triomphe" in Paris, upwards of 160 feet in height, 147 feet in width and 72 feet in depth. It is the largest arch of its kind in existence, and was built to commemorate the military triumphs of Napoleon. Beneath the great central archway is the Tomb of the Unknown Soldier of France, corresponding to the British Unknown Warrior's grave in Westminster Abbey.

The park of Paris is the Bois de Boulogne, outside her western borders.

Not far from the city is the great Palace of Versailles, and away to

NEARLY ONE THOUSAND FEET HIGH



Mondiale

An outstanding landmark of the city of Paris, the Eiffel Tower was designed and erected for the Paris Exhibition of 1889 by Gustave Eiffel, a French engineer. The tower is constructed of iron, and is 984 feet high. Over seven thousand tons of metal were used in the work. The ascent to the top of the tower is made by an electric lift.



ST. MICHEL D'AIGUILHE

In the town of Le Puy, in France, stands the remarkable church of St. Michel d'Aiguilhe, built on a high needle-like rock.



Photos : Will F. Taylor.

ST. MALO

Quaint old St. Malo is a seaport of Normandy. The town itself is particularly picturesque, with an ancient cathedral.

the south-west the forest of Fontainebleau with its royal palaces built by the monarchs of France from Francis the First to Napoleon.

The Real France.

What is this country of France whose busy heart is Paris, where all roads and railways converge, and where life is so very different from that of London? We shall be wrong if we think of France only as a place for tourists and holiday makers, although she has more perhaps to give them than any other country in Europe—beautiful scenery, wonderful old towns, priceless art treasures, and endless gaiety.

First of all France is the home of some forty-one millions of people, many of whom are farmers, for France is one of the leading farming countries of Europe. Most of the farms are small, where the hard-working peasants use the spade and the fork more than they do the plough. Half the agricultural land grows grain, especially wheat, but a good deal of maize is cultivated in the warm south.

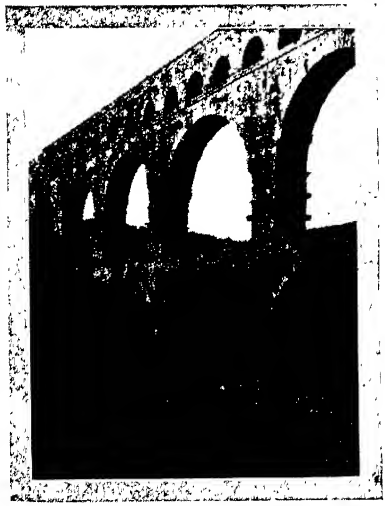
France is farther south than Britain, and on the whole is much warmer, especially on her sheltered Mediterranean shores, where mild winters bring crowds of visitors to the French Riviera, to Nice, Monte Carlo, Mentone and others of its brilliant string of seaside resorts. But in north-eastern France winters are more severe than ours, although summers are hotter.

The pastures of Normandy and Brittany are the homes of fruit growers and dairy farmers. The vine-growers live in the warm lands of the Garonne basin around the busy port of Bordeaux and in Burgundy and Champagne, which give their names to the wines they produce. The orange-groves and olive yards of France are in the Mediterranean lands of the south-east, but the fields of flax and sugar-beet are in the cooler northern and eastern plains.

The Core of France.

The core of France is the old block of the Auvergne Plateau, on whose top are the broken-down cones of prehistoric volcanoes, known locally as "puys." From this central core the great tributaries of the Loire and the Garonne come down. The eastern edge of this plateau is called the Cevennes, from the top of which you can look eastward across the Rhone valley to the snowy peaks of the Alps. The Mont Cenis Tunnel bores through these Alps to provide a way from France into Italy.

France is a busy manufacturing country, too, especially on the northern coal-field, where large factory towns like Lille, Roubaix, Tourcoing and Cambrai make linens, woollens and cottons, as well as goods of iron and steel. The great silk city is Lyons, where the Saône joins the Rhone. Every one who knows anything about fine china and porcelain has heard of Sèvres and Limoges.



A ROMAN WATER CHANNEL

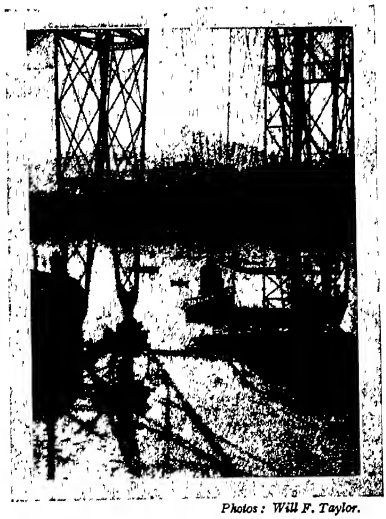
The Romans built many fine aqueducts. The example shown above is the Pont du Gard, outside the city of Nîmes, in France.

Great French Ports.

The important French port of Marseilles has soap factories and fish canneries; it is the centre of trade with the French colonies in Northern Africa and in the Far East. Bordeaux does great business with the Latin republics of South America, as well as with Northern Africa and Western Europe to whose ports she sends her clarets and brandies.

Brest, which figures in the stories of both the World Wars, is too far from Paris and too much out of the way at the end of the peninsula of Brittany to become a really important commercial centre. Cherbourg is better off and nearer Paris; it is a regular port of call for many Atlantic liners.

France has much to offer those who love beautiful things, and all who are interested in her past history. Brittany and Normandy are not only pleasant in their little villages, their pastures and orchards and flowers, and their



Photos: Will F. Taylor.

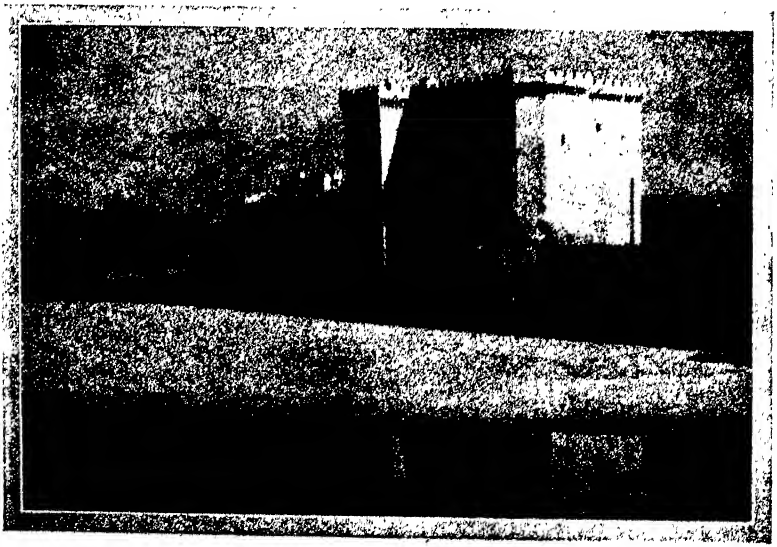
MARSEILLES HARBOUR

The transporter bridge over the old harbour at Marseilles. Marseilles is the principal seaport of France.

FISHERMEN BACK FROM THE SEA



France's western province, terminating as it were in a Land's End as does England, Brittany has many characteristics of our own Cornwall and Wales. The Bretons have charming fairy legends, customs and dress. In this photograph we see fishermen in the harbour of Concarneau.



Photos : Will F. Taylor.

This romantic Castle of Tarascon stands on the banks of the River Rhone in the south of France and was a favourite summer home of King René the Good. He was born so long ago as 1409 and was noted for his poems and other writings. In recent years the Castle has been a prison.

FROM THE FAR-OFF DAYS OF THE GAUL WHICH ROMANS CONQUERED

Carcassonne, one of the most romantic cities in the whole of Europe, stands to-day fortified and battlemented precisely as it was in the Middle Ages. The city is to be found in the narrow gap between the Cevennes and the Pyrenees, and was a stronghold in the time of the Romans.

delightful seaside places, but in their towns are fine old castles and churches, and old houses and streets that recall the days of Norman William and of the Plantagenet kings who had dominions there in the Middle Ages.

Roman France.

Southern France has wonderful old buildings that remind us of the times when imperial Rome was mistress of Gaul—the magnificent Roman arena at Arles, the great Roman aqueduct at Pont du Gard, the Temple of Diana and the arena at Nîmes, are well-known examples. There are, too, many ancient buildings that give us far-off glimpses of the France of the Middle Ages—Avignon, where the Popes had their palace in the third quarter of the fourteenth century; Tarascon and the Chateau of King Réné, and Boulbon with its stronghold of Raymond, Count of Toulouse.



ON THE BRIDGE OF ST. BÉNÉZET *Will F. Taylor.*

Avignon, another fortified city of France, stands on the River Rhone, about fifty miles from Marseilles, and here the Popes had their palace in the fourteenth century. At about the same time the bridge seen above was constructed, with a chapel on a central pier dedicated to St. Bénézet. In olden days bridges were often adorned with small chapels. Avignon was a city of the Gauls.

On the western side of the Auvergne, too, are more old cities, and other fine old castles and churches, some perched dizzily on the very pinnacles of volcanic stumps, like the church of St. Michel d'Aiguilhe in Le Puy of the Haute Loire. But perhaps the most marvellous sight in all France to the student of history is the old city of Carcassonne — a complete fortified city of the Middle Ages existing in almost perfect condition at the present day. The old defences are mainly those of the sixth, twelfth and thirteenth centuries. The place was a stronghold in the days of Roman Gaul.



Donald McLeish.

ALL IN A ROW—HOLLAND'S RISING GENERATION

This fascinating photograph was taken in the village of Volendam and shows seven little Dutch boys and one small girl in their quaint national costume, complete with clumsy wooden shoes or sabots, which are both warm and waterproof. The village is one of industrious fisherfolk, and it is from Volendam that one leaves the mainland for the well-known Island of Marken.

A TRIP IN A TRAMP

THE ship lay discharging at Rotherhithe. Stark had a little difficulty in finding her, for the wharf is at the end of a tangle of squalid streets, and its entrance is so easily mistaken for the gateway to a junk-yard. He passed the close inspection of the tough-looking guardian of the door, and was directed to follow a wooden gangway that hugged the side of a big black timber building whose foundations were set deep in the evil-smelling mud of the creek.

The noise that had been a distant rumble as Stark had entered the gateway, became a roar and a rattle when he turned the corner into a blinding rain of dust and chaff; the ship was still discharging, and could be only dimly discerned through a sort of haze that hung about the wharf. Bulky shadows slid up into it and down again into nothingness. Less bulky and more active shapes moved energetically here and there, to a bawl of hoarse sea voices.

The Skipper.

He pushed forward and touched one of the men on the arm. "Where's the skipper?" he asked. The man jerked a thumb back over his shoulder without a word. The inquirer turned and saw a tall wide-shouldered man coming towards him. Stark introduced himself as "the passenger." The captain grinned pleasantly, and in a voice heard easily above the din, said: "We carry no passengers; you'll sign on as extra cook; and what's more

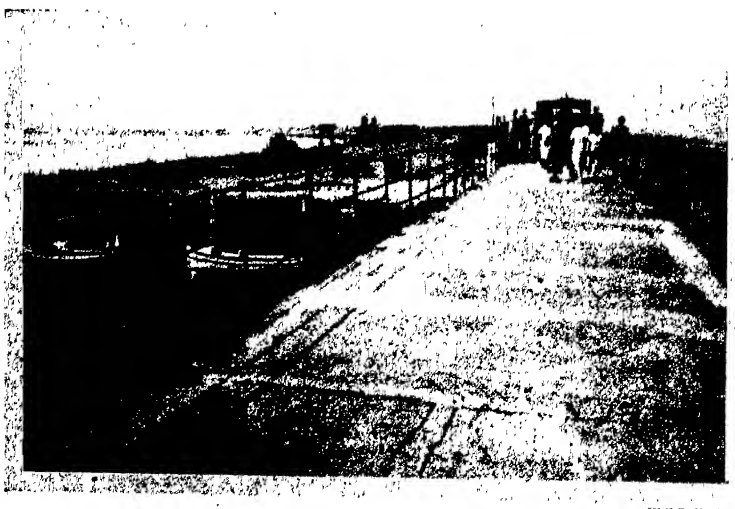
you'll be paid a bob a week, whether you like it or not! We are not allowed to carry passengers. Of course," he added as an afterthought, "you won't do any cooking. That might be dangerous—to us! But a cook you'll be on the ship's books. Come along and have a look at her."

He led the way across the wharf to where the ship lay surrounded by a family of barges and lighters. Stark followed him down a narrow iron ladder greasy with Thames mud, leapt perilously from its bottom rung to the nearest lighter, crossed its deck and the decks of two or three others and swarmed up a ship's ladder to the iron deck of the steamer that was to be his home for the next three weeks or so.

"We are discharging barley," said the captain. "Barley from Oran in Algeria. We're nearly finished. We shall drop down with the tide early to-morrow morning. Come and have a look at your quarters."

The Ship.

The *Marta* was one of the thousands of efficient cargo boats that poke their noses into all the ports of Europe, picking up cargo where cargo is to be found, and never quite knowing what their next voyage will be. She had fairly roomy accommodation amidships, deep well-decks fore and aft, and a high forecastle. She had carried Scandinavian timber to Algeria, brought barley to London, and now was to proceed "light" to Antwerp to pick up a heavy cargo of bricks and cement for Finland. "The Finns," remarked the captain, "are building more and more with bricks and cement. Wooden houses on stone foundations were all very well in the old days; but there was always the danger of

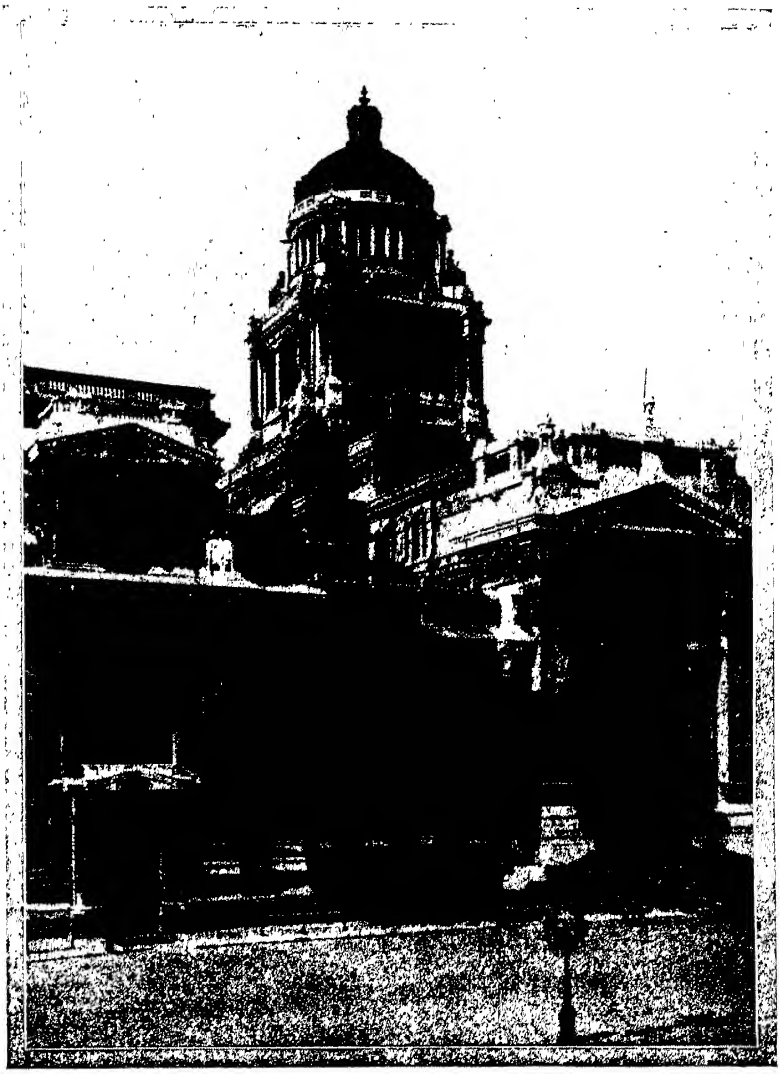


Will P. Taylor.

THE MOLE AT ZEEBRUGGE

Prior to 1914, Zeebrugge was known chiefly as a seaport town at the mouth of the canal which links it with Bruges. During the War of 1914–18 it served as an important German submarine base. Fortified by the Germans, it became necessary to block the harbour, and this operation was carried out most brilliantly by a British naval force under Vice-Admiral Sir Roger Keyes on St. George's Day, April 23rd, 1918. The Mole shown above was the scene of fighting of an exceptionally severe character.

BRUSSELS' PALACE OF JUSTICE



Donald McLeish.

One of the largest buildings in Europe, the Palais de Justice at Brussels has an area actually exceeding that of the famous St. Peter's at Rome and is so vast that it makes one think of the mighty structures of Ancient Greece. The Palace was completed in 1883 and towers to a height of 400 feet—as great as that of the spire of Salisbury Cathedral. The figures at the corners beneath the dome represent respectively Justice, Clemency, Strength and Law.

THE LION OVER THE BATTLEFIELD



That brilliant commander, the Duke of Wellington, numbered at the Battle of Waterloo a large force of Belgians among the Allied troops with which he opposed Napoleon. The campaign took place on Belgian territory, and the site of the battlefield is marked to-day by this huge mound of earth which rises to a height of 200 feet near the farm of La Haye Sainte. The mound commemorates the part played by Belgians in the conflict, and is surmounted by their national Lion.



Photos: Donald McLeish.

In what are called the " Low Countries " (the Netherlands, Belgium and Luxemburg), as well as in many parts of France, dogs are still widely in use to draw small carts. Here we see a Belgian milk girl on her rounds and her four-footed helper does not appear to be unhappy in his work.

The captain, coming down to breakfast, eyed him critically. "Feel all right?" he grinned. "Pass the sausage, please," replied the passenger indifferently. It was just as well to let the skipper know that his passenger was no land lubber going on his first voyage, and he made a point of eating as huge a breakfast as possible!

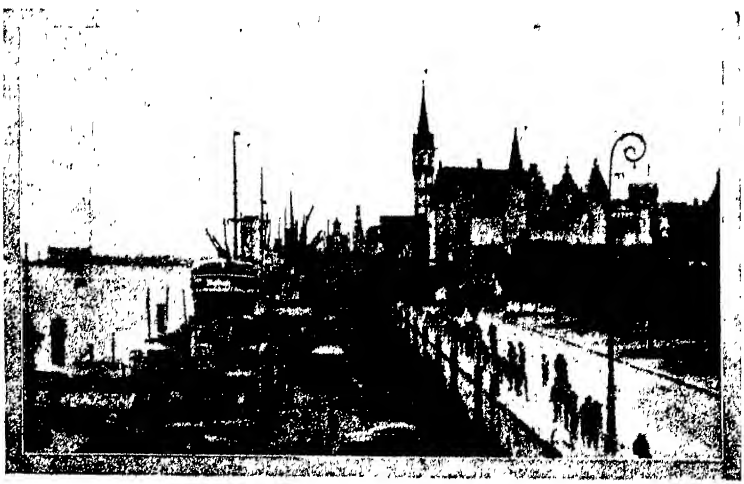
The Other Side.

As the day wore on the weather moderated. The *Marta* wallowed her way to the West Hinder Light and on to the Wandelaar, until Stark could see plainly the long yellow beaches of the Belgian coast, and the groups of box-like hotels and flat-fronted houses that showed where the popular seaside resorts were catering for their summer thousands. Farther to the north the yellow gleam of sand-dunes and the waving arms of windmills proclaimed Holland and the mouth of the Scheldt.

Flushing was there, he thought to himself. Presently his keen eye could discern one of the giant gantries of the port; then, after another pipe of tobacco, he could see Flushing sitting at the gate of the Scheldt and the pilot launch tearing out towards the ship.

Eight and a half hours up the winding mouth of the Scheldt, between long mud-banks visible at low water, and others unseen, but carefully marked by buoys, brought the *Marta* at a late hour to the long water-front of Antwerp. She dropped anchor to await her turn for entering dock, just opposite the Cathedral, whose mighty tower is the outstanding landmark for miles around, and not far from the old Steen, once a fortress guarding the port, now a museum whose crowded rooms and winding staircases contain more wonderful things to the cubic yard than any other building on earth.

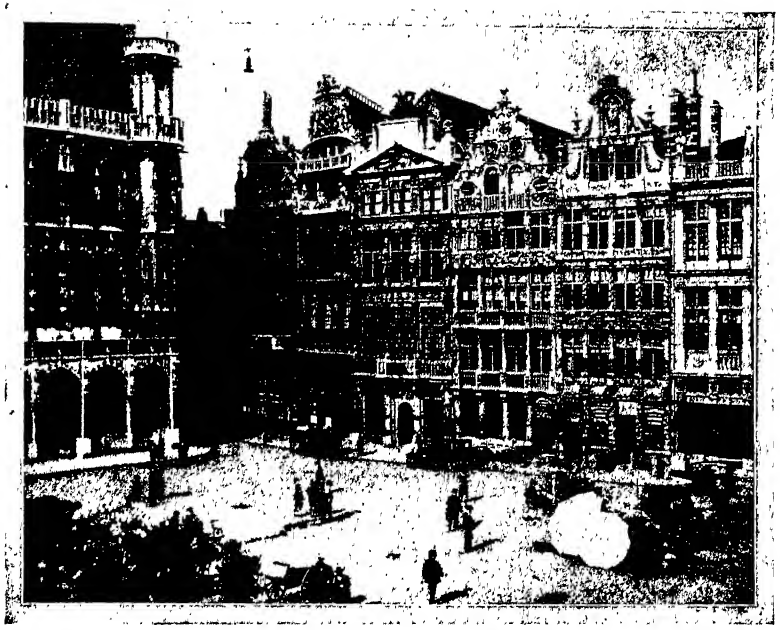
The mail boat for Harwich had passed the *Marta* earlier in the evening; she would make a far swifter and much more comfortable passage



Donald McLeish.

AT THE WATER FRONT AT ANTWERP

The second city of Belgium, and that country's chief port, Antwerp is about fifty miles from the sea and stands on the Scheldt, which is here too wide to be bridged. Our picture shows the busy quayside. The ancient building on the right is the tenth-century Steen Castle. Antwerp has suffered heavily from aerial attack in both the World Wars.



Donald M. Leish.

IN THE MARKET PLACE OF BRUSSELS (1938)

Considered to contain perhaps the finest assembly of mediæval buildings on the Continent, here is a view of the Grand Place in Brussels. On the left is the Hotel de Ville or Town Hall, dating from the sixteenth century. Most of the other edifices are Guild Houses. They were erected by organisations connected with different trades and callings. The Shippers' Guild House is surmounted by a gable that represents the stern of an old-time sailing vessel.

than the slab-sided cargo boat whose top speed was less than eight knots—all out!

In Dock at Antwerp.

Soon it was up anchor again, and a slow push towards the maze of light ashore. Passage through the lock gates was orderly but slow; the *Marta* felt her way gingerly through a crowd of giant barges and big ships until she came to her appointed berth in the Kattendijk Dock. Stark turned in. Next morning he heard the news that the cargo had not "come down the line."

"You'll have four or five days here," said the captain ruefully. "Loading bricks and cement is a dusty, noisy business. I should take a turn ashore if I were you. Anyhow, if you don't show up for a day or two I shan't worry!"

Stark quickly made up his mind. He had visited the Low Countries many times before—often enough, in fact, to be able to make the best use of his time visiting the places that he felt were worth while—places that interested *him*, and not necessarily the show-places of guide books and the conducted tours.

He resisted the temptation to stand by the ship and potter around the docks, where it seemed were gathered the ships of all the nations and where

you could hear almost any tongue that is spoken by sailormen no matter how remote their country. He knew the Belgian coast resorts—Ostend, Blankenbergh, and the rest of them—as well as he knew Brighton. He had no desire to visit the battlefields—he had seen enough of them before they became objects of pilgrimage to the curious—and he had seen that long Mole at Zeebrugge, where a deed was done that will go down to history as one of the heroic achievements of the War of 1914–18.

Stark made up his mind to hire a car and use his time in seeing as many of his old haunts in the Low Countries as he could. You know, perhaps, that Belgian chauffeurs are no pavement crawlers: like Jehu of old, they drive furiously. Roads are good, Belgium is only a little country and so is Holland, so Stark was able to go from one end of the Low Countries to the other in a week, catching once again some of the ancient charm of quiet places he had learned to love, and seeing some parts which he had never visited before.

In Belgium.

Belgium seemed to him a land of many villages with fine old towns dotted here and there at nodal points, raising their tall belfries to the sky, and gathering up the trade of the surrounding countryside in their ancient market places. A busy land, and a land cultivated like a garden when you get away from that sandy coast strip on to the rich agricultural land between it and the old coast-block of the wooded Ardennes. A land where women and children toil in field and garden as they never toil in Britain; even the dogs are pressed into service as beasts of burden — and seem to like their jobs too. You could see that, if you knew anything at all about dogs.



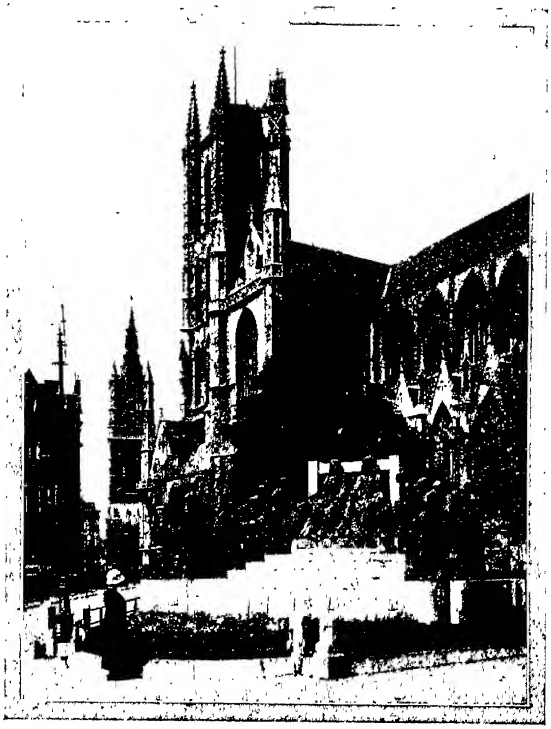
Donald McLeish.

THE BELFRY OF BRUGES

In the Grand Place of Bruges stands the famous Belfry, here seen from the calm waters of one of the many canals which intersect the city. The Belfry rises to a height of 352 feet and was commenced in the year 1282, being completed two centuries afterwards. Bruges is the capital of West Flanders.

Beyond the fields of wheat and rye, of sugar beet and tobacco, of roots and vegetables; beyond the hop-fields and the flax-fields, and the villages that stand on the roads like beads upon a string, Stark found new country—new to him, that is. He came to the great industrial region of Belgium that lies on or near the Belgian coal-field in the valleys of the Sambre and the Meuse along the northern edge of the

Ardennes. There were Namur and Liège, with their iron and steel works; Mons with its coal-pits and iron foundries, and Charleroi with its great plate-glass factories. Courtrai with its linen industry in the flax country of the basin of the River Lys, lay well away to the north-west, looking from East Flanders across the river to West Flanders and the old city of Ypres rebuilt after the War of 1914–18.



Donald McLeish.

A MONUMENT TO TWO BROTHERS

Our section "Great Painters of All Nations" tells us of the two brothers Hubert and Jan Van Eyck, who were the real originators of oil painting in the fourteenth century. Above is the brothers' monument erected at Ghent, one of the chief industrial centres of Belgium. In the background is the Cathedral of St. Bavon, which contains "The Adoration of the Immaculate Lamb," a work by the Van Eycks.

Famous Old Cities.

From Namur's high fortress, at the confluence of the Sambre and the Meuse, Stark went along the road that follows the beautiful gorge which the latter river has cut in the limestone edge of the wooded Ardennes, as far as Givet on the French Frontier, and back again across the coal-field to the rich plains of Brabant and the City of Brussels. "Little Paris" they call it, but Brussels has charms which Paris has not; nowhere in the French capital will you find a square with famous old buildings grouped round it such as you may see in the Grand Place; nor will you see so monumental a pile as the great Palais de Justice set high above the city on its terraced hill, as if gods, not men, had placed it there.

Back again through flower gardens and bulb fields equal to any in Holland, to old Ghent, still one of the most important industrial centres in Belgium. Stark hurried to see once again the great Castle of the Counts of Flanders—aloof and islanded, a piece of the ninth century standing in the twentieth; the famous old Cloth Hall which in the fifteenth century was the centre of the world's trade in wool; and the ruins of the Abbey of St. Bavon, where John of Gaunt was born in 1340. Then on he went to Bruges, the Queen of Flemish cities, whose

WHERE AN ARMY STOOD FAST



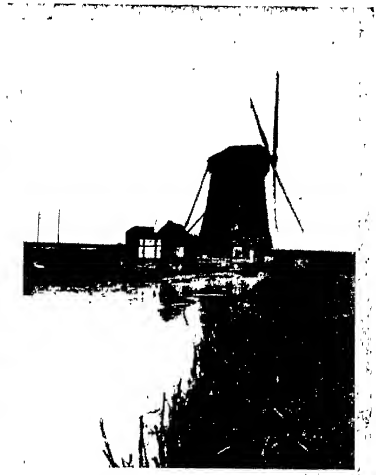
Central Press.

From 1914 to 1918, during the progress of the Great War, the British Army occupied and defended the historic old town of Ypres and barred the passage of the German Army to the Channel ports. Many thousands of men left the town by the Menin Gate; and here, on Sunday, July 24th, 1927, the late Field-Marshal Lord Plumer unveiled the above memorial.

IN THE LOW COUNTRY



Hardy fisherfolk of the island of Marken, in Holland. Marken is only a few acres in extent, and the houses are built on piles.



Windmills in Holland are not so numerous as was once the case, but many are still to be seen. They are used for grinding grain.



Photos : Will F. Taylor.

Here is a typical scene at a cheese market in Holland. The round pink cheeses are set up for inspection in pyramids, closely resembling piles of gigantic cricket balls. It takes 50 lbs. of milk to make a " cannon-ball " cheese weighing about 4½ lbs.

belfry still rings the old tunes, and gives those who climb to its giddy height a wonderful view of Flanders and of the great ship canal as straight as if ruled on a green sheet, linking Bruges with its sea harbour of Zeebrugge.

A Flying Visit to Holland.

Half of Stark's week had nearly gone when he got back to the Kattendijk Dock at Antwerp to have a look at the *Marta* and see if there were any prospect of an early sailing. The captain had gone up to the agent's office, the mate told him; there was not the slightest chance of the ship getting off for another four days.

That made a visit to Holland possible, and soon Stark's chauffeur was speeding along the 'bus route from Antwerp across the frontier to sleepy old Bergen-op-Zoom, that looks westward over the flat islands and winding waterway of the combined deltas of the Maas and the Scheldt. His first objective was Delft, the lovely old Dutch town that is as much a favourite with artists as Bruges in Belgium. This meant passing through Dordrecht, and the great port of Rotterdam, which stands on the "new waterway" some few miles from the sea and its outport of the Hook of Holland, where the mail boats from Harwich berth. Rotterdam was attacked by the German air force without warning in 1939. Hundreds of thousands of its citizens were killed or wounded and a great deal of the city completely destroyed.



Donald McLeish.

HERE FORTY-TWO BELLS RING OUT

The city of Utrecht, in Holland, is partly divided by the Oude Canal, affording one many glimpses of placid waters, quaint bridges and ancient houses. On the right is seen the tower of Utrecht Cathedral, carried to a height of 338 feet and containing no fewer than forty-two bells. Bells assembled in such numbers are known as a "carillon."

Just as Belgium seemed a land of villages with occasional big towns

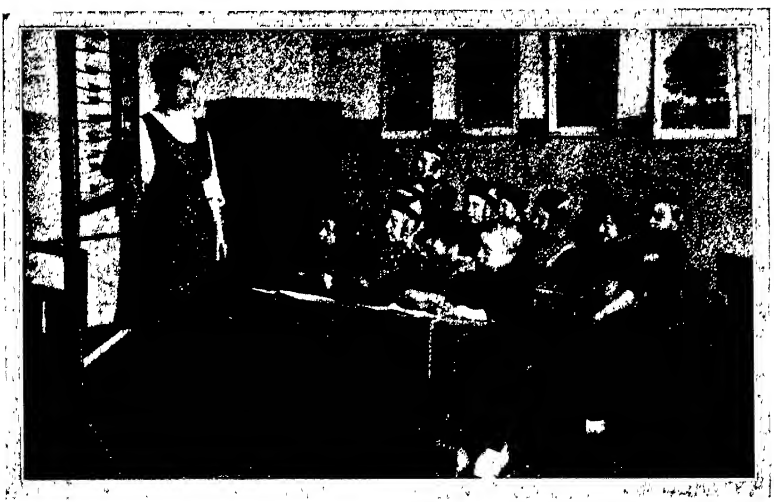
CAMEOS OF LITTLE DUTCH CHILDREN



The ancient mariner depicted above is a native of the shores of the Zuyder Zee. He is imparting a lesson in rigging a model boat to the little boy, who is plainly a chip of the old block.



Here is another picture of the children of Volendam in their native costume. It would almost seem that the two wee girls are in rivalry for the favours of the Dutch boy, who sits at a cottage door.



Photos: Donald McLeish.

This photographic study shows us the class-room in the village school of Staphorst, in Holland, where among the youngsters there happen to be more girls than boys. It is interesting to note that until they are six years old these Dutch maidens wear a cap of astrachan, as depicted. After that age they adopt the head-dress of the women of their cleanly and industrious homeland.



Donald McLeish.

A HUMBLE HOME IN HOLLAND

If you were on the island of Walcheren, in the estuary of the Scheldt, and could enter some of the homes, this is what you would probably see. Note the proud young mother with her first-born, the model boat and tiling over the mantel and the atmosphere of simplicity. Throughout Walcheren the land must be guarded by dykes and dunes from the inroads of the sea.

among highly cultivated fields and gardens, so, to Stark, Holland appeared to be a country of wonderfully neat and clean towns, with their red-roofed houses compactly snuggling around the great belfries which the Dutch have reared as if to defy the flatness of their grassy meadows.

The Persistent Dutch.

This land of bulb gardens and dairy farms is the home of the most orderly, the most persistent fighters and the most tireless workers in Western Europe. For long generations these phlegmatic Dutchmen have fought to keep the sea out by strong and well-kept dykes, to drain their lowlands by means of steam pumps and windmills and by canals.

Draining the Sea.

They have not only kept the water out, they have also won back from it some of the land it stole; they are still winning it back, for large parts of the Zuyder Zee have been drained by clever Dutch engineers and have become dry land, adding many thousands of rich acres to the kingdom of the Netherlands. Lands thus reclaimed are called polders; near Haarlem there is a very famous one which in spring is a rich many-coloured carpet of flowers, whose bulbs are gathered, graded and sent all over the world where there are gardens and where the climate will permit tulips and hyacinths to flourish.

From Delft, Stark went north across meadowlands cut into a thousand patterns by canals and dykes, with here and there gaunt windmills with arms awhirl, or the great brown sails of vessels that seem to be voyaging overland, so unexpectedly do they rise from the plain of green that stretches unbroken to the horizon. These canals are highways as well as drainage canals; in summer they are crowded with schutys, boiers, and the markt-schepen (market boats), in which the farmers take their produce to market; in winter they are glassy roads over

which sledges glide and skaters skim like swallows.

Excursions from Amsterdam.

Past The Hague, capital of the Netherlands, with its quiet and dignified streets, and through Leyden, the University city of Holland, Stark pushed on to Amsterdam, the city of canals and the "Venice of the North," where he chose a quiet little hotel as his headquarters for a day or two. For from Amsterdam you can go by "stoomtram" — the puffing toy train which is common in Holland —to numbers of interesting spots, especially to some of the little old fishing towns along the western shore of the Zuyder Zee— Monnikendam, Volendam and Hoorn. From Volendam you can get a passage to the island of Marken, where the fisher-folk love to display their national costume before admiring visitors from the outer world. Marken is unique in one respect—it has no cows! And that, indeed, is strange to Holland.



Donald McLeish.

AN OLD-FASHIONED STREET

Middelburg occupies a position in the centre of the island of Walcheren, and is a busy place with many industrial activities. That it is very quaint is proved by this photograph, taken in one of its most old-fashioned corners.

You can go, too, from Amsterdam by the North Sea Canal steamer to Zaandam, "the capital of windmill land," and on to Ymuiden, where the great sea-locks open to let in the big steamers coming up the canal to Amsterdam.

Something urged Stark to cut short his trip by a day. He couldn't have told you what it was if you had asked him; but when he did get back to Antwerp and the *Marta*, he found that she was on the point of sailing without him.

"Sorry, Stark," apologised the captain, as the tug took her in tow. "Owner's orders, you know! Can't be helped. We're off to Finland now in one run!"

Through the Baltic.

The *Marta* "lay to" off Flushing to land her pilot. It was two o'clock in the morning, and a freshening north-westerly gale made her roll heavily in the cross seas. Stark put his head out of his cabin door and saw the lights of

the Belgian watering-places far away in the haze. The stoppage of the ship's engines had awakened him. He turned in again, hoping for sleep. The *Marta* was soon under way again, but her roll became worse, and every now and then her screw raced madly as her stern lifted, so Stark slept but fitfully.

Morning found the ship wallowing north slowly, making heavy weather of it. Stark could see the yellow dunes and the low coast away to the eastward for a time, then nothing. "The old lady feels it a bit," said the captain, as the *Marta* seemed to take in most of the North Sea on her port side to spill it overboard again on the other. "Never mind," he continued, "we'll get better weather as soon as we round the Texel light; the wind is backing a bit, and we shall have it astern of us by then."

Heligoland.

He spoke truly. Slow as the old ship was, she made good time when once the Texel was rounded and she was running eastward for the Kiel Canal. The weather fined down splendidly, and it was a bright, sunny morning when Stark saw some distance away to port the German island of Heligoland, sitting on the brilliant waters for all the world like a gigantic reddish cake, with a chunk of it about to break off at the western end. Its tall lighthouses were plainly visible, and towards the eastern end Stark caught a glimpse through his binoculars of the little seaside town that is so



EUROPE'S "VENICE OF THE NORTH" *Will F. Taylor.*

Amsterdam is sometimes called the "Venice of the North" because of the innumerable canals upon whose banks so many of its houses are built. Barges afford a ready means of inexpensive transport, and people go to church by boat instead of along a road, though during the severe winters skates are as freely used. Amsterdam is the commercial capital of Holland, but the seat of the Government is The Hague.

SITTING BY THE ZUYDER ZEE



Donald McLeish.

The four delightful old fellows who figure on this page are fishermen of Volendam in Holland. No doubt they are exchanging yarns during a brief spell in harbour and telling of some adventures afloat. Volendam gives ready access to the Zuyder Zee, more and more of which is being skilfully drained to win additional dry land for the thrifty Dutch farmers and bulb-growers to work. The stretches of land so won from the hungry waves are known as " polders," and have to be protected by immense dykes on the seaward side.

popular as a holiday resort with Germans. A great white steamer, bringing a full load of holiday-makers from Bremen, crossed the *Marta's* track soon afterwards.

The captain nodded his head towards the island. "Good job we gave it away," he said. "The sea is gradually eating it up, although they have built great sea walls to prevent it. There won't be anything left of it in another thousand years!" Stark remembered then that Heligoland was once British, but had been exchanged for certain valuable territories in Africa in 1890.

Through the Kiel Canal.

The ship steamed on past the succession of big red Elbe lightships that show the way to the port of Hamburg, towards Brunsbüttel-Koog, the North Sea entrance of the Kiel Canal. The sea seemed sown with ships; all the world appeared to have sea-business with Hamburg. Stately American liners, grey vessels from the Far East, grimy tramps and rust-streaked cargo boats, great oil tankers and Scandinavian timber-boats, their decks stacked high as the funnels with timber, all had Hamburg as their goal.

Now Stark could see Brunsbüttel's tall red tower at the entrance to the Canal lock-gates. With his glasses he made out the great dials on it, giving not only the time but the temperature and pressure conditions. Soon the *Marta* came to a stop, and her rusty cable roared through the hawse-pipe as her "mud-hook" sought a hold on the bottom. After a long wait she moved into the entrance to find it crammed with motor fishing craft, sailing ships and steamers of all sizes. The *Marta* tied up to the side, and officers in green and brown uniform, or in blue, came aboard to examine her papers.



E. N. A.

A FISHER FOR LOBSTERS

By nationality this man is Frisian, and he is a splendid example of the lobster fishers to be found on the shores of Heligoland. This island once belonged to Great Britain, but became German in 1890, when it was exchanged for territories in Africa. The distance round Heligoland is about three miles.

Beyond the great lock-gates Stark could see the long wide straight stretch of the Canal — the biggest thing of the kind he had ever seen. After another long wait, the gates were opened, the fishing craft scuttled through first with a great outpouring of foul gas from their exhausts, and the big ships followed with the

dignity that becomes deep water vessels.

It was hard to believe that this water channel cut through the base of the neck of the peninsula of Jutland had been made by men. It was so wide, so unending, and so much like a straight, deep river. But Stark remembered seeing at the entrance a great bronze tablet commemorating its opening and announcing reverently that its completion was achieved during the reign of the Kaiser Wilhelm II.

Miles and miles of canal, miles and miles of cultivated fields and of meadow thickly dotted with grazing cattle; there seemed no end to it. Once a great bridge spanned it high up—an incredible thing. Now and then vessels passed. Night fell and twinkling lights appeared. It was nearly midnight when the ship stopped at Rendsburg to take in fifty tons of coal. Stark and the skipper went ashore to get away from the dust and the noise, and found their way up to the town. Everything and everybody seemed asleep; but it was good to stretch one's legs for a bit.



E. N. A.

CLIFF-FACES OF HELIGOLAND

One is not surprised on seeing this picture of the coast of Heligoland to learn that the island is dwindling away. The cliffs are formed of limestone and sandstone in strata which can be very plainly discerned, and they are readily eaten into by stormy seas. At one time the Germans attempted to build artificial cliffs to checkmate the waves.

Into the Silent Sea.

They returned to find the crew cleaning up, and soon they were under way once more. Holtenau at the Baltic end of the Canal was passed during the small hours, and when Stark peeped out of his door at sunrise he could see the green flat islands of Denmark far away to port.

Denmark he remembered chiefly from crossing it on his way from Harwich to Sweden a few years before—a green, flat, pleasant land, rich in cattle, and studded with dairy farms

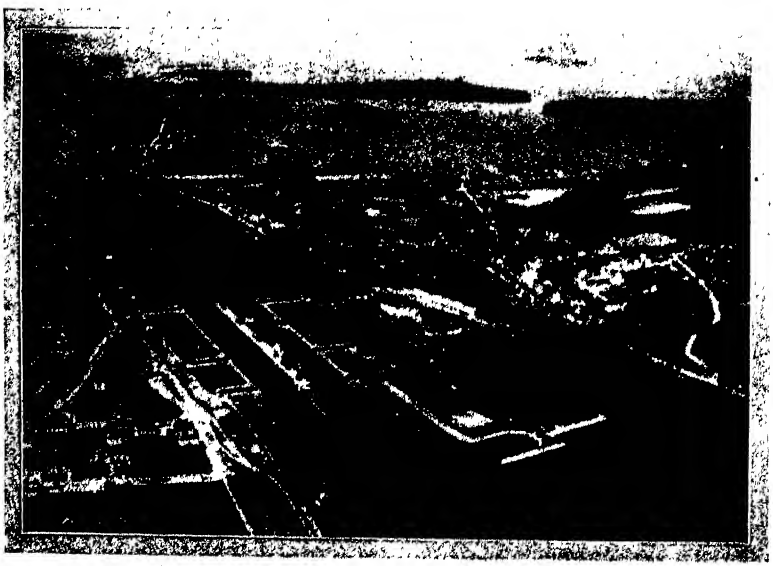
and incredibly neat towns and villages. You go from Esbjerg on the sandy and rather barren western side of Jutland, across the neck of it to Fredericia, and then by alternate rail and train-ferries across the Danish islands at the Baltic entrances to Copenhagen, which Stark thought one of the finest cities in Western Europe.

The train-ferry from Warnemünde in Germany—a great white ship—crossed their track on its way to Gjedser in Denmark. The other, which has a much longer run between Sassnitz in Germany and Trelleborg in Sweden, they missed. Stark caught a distant glimpse of the Swedish coast towards the end of the day, but that was all. The Baltic seemed to swallow up the ship with wide level loneliness, save for a few hours one day when Stark saw the high coast of the island of Gotland, and wished they could have called at the ancient port of Wisby, which in the Middle Ages nearly outrivalled London, when it was a stronghold of the Hanseatic League.

As the ship made her way north, the water became fresher and fresher. The *Marta's* forecastle and well-deck were crowded with clothes-lines, for the crew were taking advantage of the fresher water and the sunshine to have a grand washing day.

A Maze of Islands.

A squall or two blew up and passed, leaving calm and a haze behind. That haze seemed to bother the captain, who stood on the bridge the whole of the day, getting more and more anxious as evening came on. He knew they were approaching the maze of islands that lie scattered in their thousands off the southern coast of Finland, some large enough to live on,



THE KIEL CANAL, AS SEEN FROM THE AIR *K. N. A.*

Serving as a link between the North and Baltic Seas, the Kiel Canal is upwards of sixty miles in length, and forms a waterway of incalculable value to the commerce of the world. If you could be a bird, the illustration shows what you would see if looking down upon the Canal where it enters the harbour at Kiel. The locks in the Canal are the largest ever made.



Wide World Photos.

SUNDAY SPENT AMONG THE TREES

Our good friends the Danes are a most industrious and a great home-loving people, and they seem to play as energetically as they work. In this picture is the lodge-keeper's house at a deer park in Denmark, and the crowd of folks assembled are all on pleasure bent, driving, cycling or walking through the forest glades as a week-end change from the normal round of duty.

but most of them mere rocks, many scarcely appearing above water, but with granite teeth hard and sharp enough to rip the whole bottom out of a steamer.

The two mates joined the captain now, and all three kept keen watch ahead with their binoculars, trying to pick up the great lighthouse of Uto, which is the outer guard of the Finnish skerries. The skipper saw it first. Soon Stark could see it, too—a tall, far pillar striped vertically in white and dark red. The ship steered directly towards it, the rocky fangs of half-submerged islets on either hand. A launch sped out to meet her, and the pilot, whose dark skin, high cheek-bones and eyes set slightly obliquely proclaimed him of Lapp rather than Finnish blood, climbed the Jacob's ladder and the steps leading to the bridge deck.

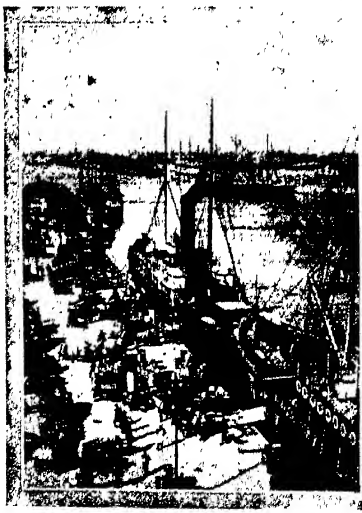
The *Marta* then went ahead slowly through this maze of islets, turning this way and that as the various lights—yellow, red or green—showed themselves in the deepening dusk. Stark noticed that directly the steamer left the open Baltic for the shelter of the islands there came a magic change from a tumbling sea to a calm so flat that the water within protecting islands was like a mirror.

A Lonely Land.

Stark could not help feeling something of the wild loneliness of this sunken land, and wondering what life must be like there in winter, among these barren rocky islands and iron-bound creeks. The rocks were smoothed down in places as if some army of giants had polished them in the dim ages before human history began. That

was the work of prehistoric glaciers. As the *Marta* glided north towards Åbo, the port to which her cargo of cement and bricks was consigned, the islands seemed to become a little larger, and many had dense growths of larches and spruce upon them. Here and there a twinkling light showed that people were living on some of them—perhaps people from the mainland staying in their summer island villa, as many of the southern Finns do. Åbo was reached at last, and the ship tied up at the long wharf by the side of its deep and tideless river mouth. Above the range of low warehouses, Stark could see the old castle with its great towers, one of which seemed to be looking down at him with fierce eyes until he glanced a second time and saw they were only windows placed so high up as to give a grotesque effect of a human face. Abo is known to-day as *Turku*.

A dozen other vessels were at the wharf, all loading either timber or wood-pulp from the forests inland.



Will F. Taylor.

COPENHAGEN HARBOUR

Copenhagen, the capital of Denmark, possesses a deep and commodious harbour and has a population of 800,000.

Tall-masted wood-schooners with a top-heavy spread of sail to catch the slightest breeze among those high and forested islands were there in scores; for this was the time of year when the people were laying in their winter store of logs. Birch logs cost most, pine logs and knots least, for they burn much more quickly than birch, which gives out great heat.

Many of the engines employed up-country still use birch logs for fuel, as you can see by the queer box-like traps on their funnels to catch the sparks and prevent the timber houses—and the forests themselves—from catching fire.

A Finnish Town.

The houses were chiefly of timber, set on high foundations of heavy stone which formed a sort of ground floor used as storage room for fuel. Stark noticed men pushing logs beneath one of the houses through a hole left in the stone-work for that very purpose. In winter the snow would be quite up to the wooden portion of the house.

In the business part of the town he saw many large buildings, some entirely of stone, others of concrete, which seemed to be a popular building material for new buildings and certainly for mills and factories. The finest of all was the Art Gallery, planned most wonderfully in timber and stone by a famous Finnish architect.

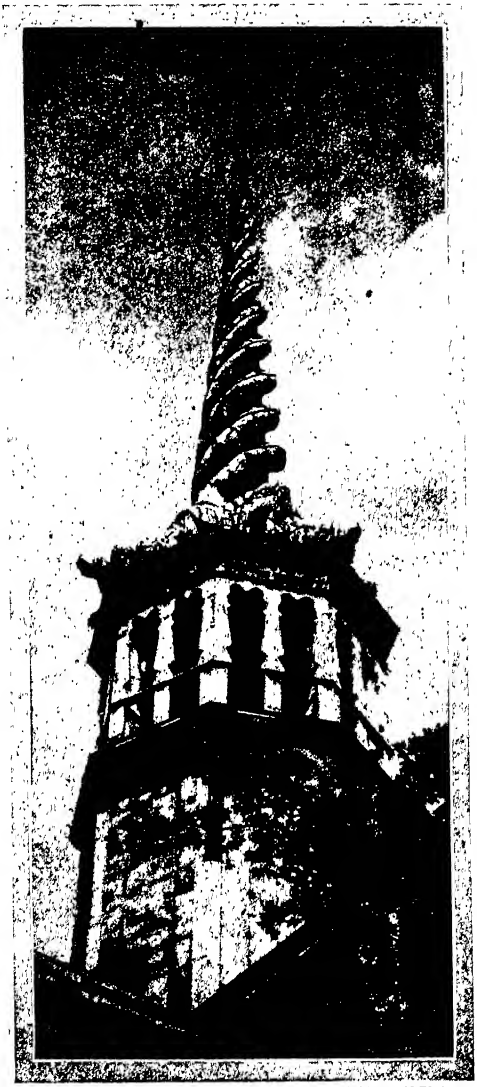
The great square market-place was full of stalls, where strange sweetmeats, fish, vegetables and fruit were being sold by the country folk, many of whom, especially the women, were clad in the gay colours of which the northern peoples of Europe seem so fond—bright reds, blues and yellows especially. Strawberries were there in their prime—yet the strawberry season had been over in England for at least a couple of months. Baskets of red berries, blue berries, and violently orange-coloured fungi attracted many customers.

At one side of the square motor buses were drawn up, and some of these, Stark discovered, went far out into the countryside to points a hundred and fifty or two hundred miles from Turku. One of these Stark boarded one morning, and after a six hours' journey found himself at Bjorneborg, or Pori, as the Finns call it, a great port for the timber and paper business. A few miles out of the town he visited a large paper and wood-pulp factory, all built of ferro-concrete, equipped with the most modern machinery and run on thoroughly scientific lines. Up the Kumo Elf he saw men cutting timber and running the logs down to the river so that they might float like a vast loose raft right to the mills.

The Land of a Thousand Lakes.

Amid the dark forests were multitudes of lakes, some large enough to hold several English counties, and then have room to spare. Low lines of hills ran across the country, their slopes cultivated here and there or clothed in thick timber. Away over to the east, as Stark knew full well, were still greater lakes, with many wooded islets in them, lending further beauty to scenery remarkable enough without them. Finland is well named "The Land of a Thousand Lakes." In the south-eastern half lakes are everywhere, and with their connecting rivers form the chief means of getting about.

Stark was due to catch



Wide World Photos.

A TOWER OF DRAGONS' TAILS

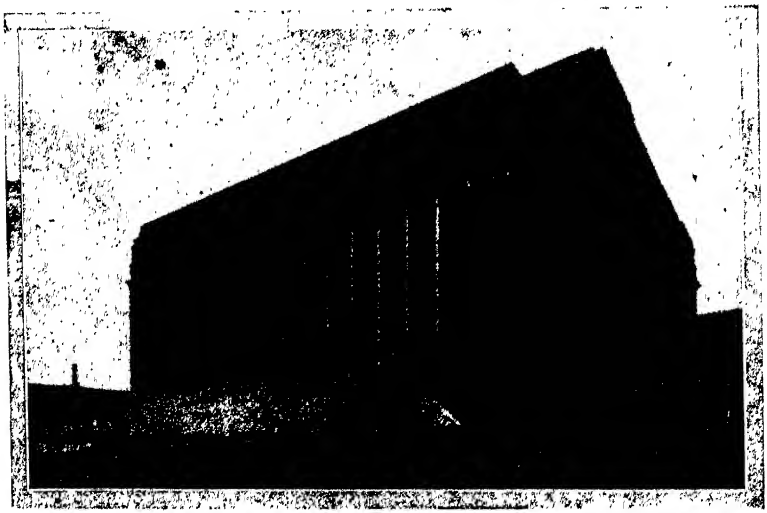
The Royal Exchange, Copenhagen, was erected in the seventeenth century. The structure is surmounted by a tower upwards of 160 feet in height, at the top of which are four dragons. Their tails, intertwined, form the tower.

SCENES IN FINLAND, THE—



E. N. A.

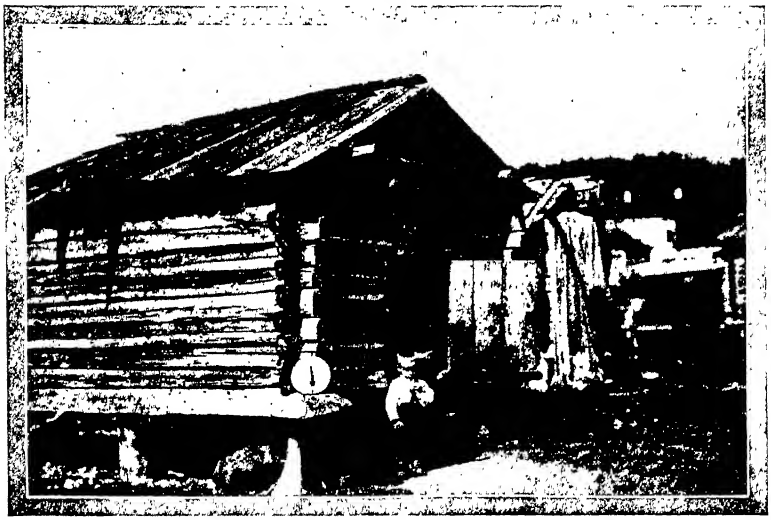
Finland is well named the "Land of a Thousand Lakes," and much of the commerce is carried on by water. In this picture we see the Market Place of the town of Viipuri, which stands on the coast of the Gulf of Finland. The squat, round tower is known popularly as "Fat Catherine."



Wide World Photos.

Helsinki is the capital of Finland and is both a magnificent city and a bustling shipping centre. One of the newest of its large buildings is the House of Representatives, completed comparatively recently and here illustrated. Within its walls are upwards of a thousand rooms.

—LAND OF A THOUSAND LAKES



Immediately to the north of Finland, extending to the Arctic Ocean, is Lapland, whose rich nickel districts have been opened up by a new railway in recent years. The log hut seen above is typical of the homes of Lapland families, and is constructed to keep out wintry blasts.



Photos: E. N. A.

Though we think of Lapland chiefly as a country of ice and snow, the short summer is very beautiful and plant-life grows at a tremendous pace. The above picture gives us an enchantingly lovely glimpse of Lake Enare, in Finnish Lapland, with a peep through silver birches.

the steamer for Hull at Helsingfors (Helsinki) in a day or two, for the *Marta* had to wait for cargo owing to a dock strike. He made time to visit the most wonderful place in all Finland—the Falls of Imatra.

Imatra Falls.

Through a long, narrow cleft between granite walls, Imatra fights her way, surging in foaming billows that wrestle and leap like struggling giants only to fall in clouds of spray as the swift river hurls itself onward. The hotel that stands within sight and sound of the Falls seems a frail and shoddy human toy compared with mighty Imatra thundering by its very door. Like Niagara, Imatra is so tremendous that she can give many thousands of horse-power to the electric power-houses near by.

Stark returned to Helsinki charmed with the scenery of the lakes and with the old-fashioned courtesy of the Finnish people. As he sat on the upper deck of the steamer, ploughing her way south down the Baltic towards the North Sea, he made up his mind that he would return and get to know more of Finland.



E. N. A.

SWIRLING RAPIDS IN A RIVER OF FINNISH LAPLAND

The Finns live in a territory that is remarkably well-wooded, most of the islets in the innumerable lakes being thickly covered with trees. The lakes themselves are often linked by swiftly running streams, and we see here the famous Rapids of the Passvik River. Many of the rapids of the country are harnessed to provide power for saw mills, for Finland is a district of lumbermen.



Will F. Taylor.

FASHIONED AFTER THE OLD NORSE LONGSHIPS

The Norwegian seaport of Bergen, so well known to Britain's summer tourists, is here seen occupying its portion of a beautiful bay. The vessels in the foreground are those of hardy fisher-folk, and it is most interesting to note that they are built almost precisely on the lines of Viking galleys of olden times—the sort of ships that figure in fairy tales. Norwegians are regarded as some of the finest seamen in the world.

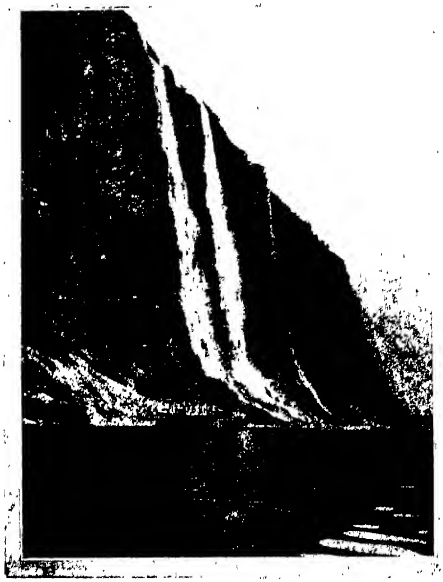
THE LAND OF THE NORSEMEN

THE great peninsula of Scandinavia is the home of peoples who are in many ways akin to ourselves, for out of its long winding fjords sailed the Norse sea-rovers who harried the shores of Western Europe, penetrated into the Mediterranean, fought their way across Russia and down the Volga, and crowned all these deeds of daring by crossing the North Atlantic in their "long dragons," and so becoming the first Europeans to set foot in the New World.

Norse Voyagers.

The Norsemen formed many settlements in our land; you can tell this to-day by the names of towns and villages where they made their homes, and occasionally you discover old family names in these districts as Norse as Norse can be. Eastern Britain and Eastern Ireland contain most traces of Norse conquest and settlement. Normandy got its name from the fact that Northmen (Norsemen), under the redoubtable Rollo the Ganger, carved out a dukedom for themselves there.

These folk from the great Scandinavian peninsula have made their mark on the map and set their names for all time in the wonderful story of the making of Europe. You can go to Norway to-day and see the same type of seafarer as the old Norseman who, when spring came, ran his longship into the fjord and set out on the "Viking path" to plunder and conquest. You cannot help noticing that the very fishing craft are the lineal descendants of the old Norse galleys—their high



NORWAY'S "SEVEN SISTERS"

Norway is a narrow country of many mountains into which the hungry sea penetrates by long, deep channels known as "fjords." The fjords themselves are often fed by falls of water cascading down almost vertical hillsides, as is illustrated by the "Seven Sisters" waterfall. One fjord penetrates inland for a hundred and six miles.

sterns and square sails and their marvellous seaworthiness are those of the old "long dragons" of the Northmen. To this day the Norwegians are among the finest seamen in the world, and they can build wooden ships with the skill that is the heritage of many centuries of shipbuilding.

Scandinavia on the Map.

Let us look at Scandinavia on the map so that we may know something of it before we visit it. It consists of two countries—Norway, the smaller and westernmost of the two, and Sweden, which is separated from Norway by the mountain backbone of the Kiolen. The Kiolen axis loses itself in the great mountain masses of the south, whose peaks soar above



Will F. Taylor.

IN A NORWEGIAN FJORD

The view above affords an admirable conception of the famous Hardanger Fjord. During the summer one gets the impression of a sheet of placid, but usually very deep water, from the sides of which colourful mountains tower as though giant walls. In places the mountains are tree-clad, though there are many bare cliff-faces over which waterfalls cascade.

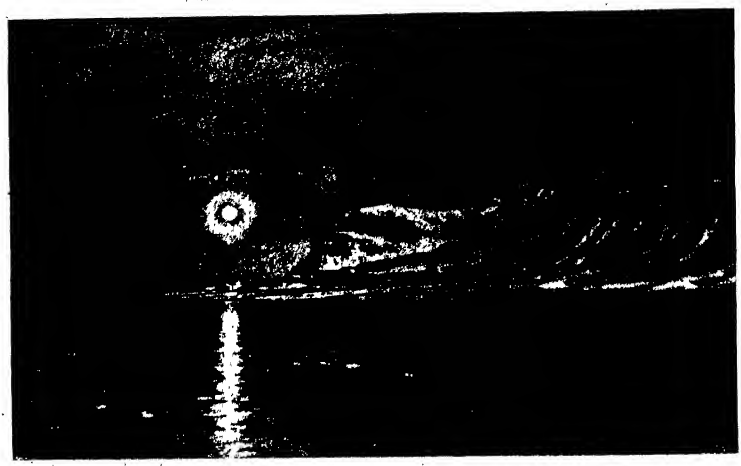
WEARING THEIR HOMELAND COSTUME



Norwegian State Railways.

This man and woman, who hail from the Telemark district of Norway, are here seen in their national costume, which is strikingly picturesque and of the gayest colours. We must think of Norway as a rugged, mountainous country, where the rivers are too swift for general navigation and the railways comparatively few, so that long journeys have to be taken by road. The mighty, rushing rivers do not run to waste, however, for in many instances their giant forces are utilised for generating electrical energy and power.

TURNING NIGHT INTO DAY



James's Press Agency.

In certain parts of Norway, and anywhere within the Arctic Circle, may be seen the strange spectacle of the sun shining in the middle of the night. At the North Cape from about 12th May to 30th July the sun never sinks below the horizon.



Mondiale.

The Lapp family, shown here, have their home in Northern Norway. As a race they are widely distributed over a number of northern countries including Norway, Sweden and Russia. They live mainly by coast and riverside fishing and also have cattle-breeding settlements.

SEEING NORWAY IN SPRINGTIME



If you were touring in Norway you would bring home with you many impressions, like photographs on your mind, of which the above is a typical example. It shows a pleasant farm in the central part of the country, a valley homestead, above which on three sides the mountains pile.



Photos : Norwegian State Railways.

Here is another impression of the Hardanger Fjord, and at a point where the mountain sides do not descend so steeply to the unruffled waters. In the foreground we see a fruit tree freely covered with gay spring blossom, but the hill-top in the far distance is still clad in a mantle of snow.

wide snow-fields, and whose upper valleys are filled with the long tongues of big glaciers reaching to points below the snow line. Part of this mountainous southern portion is called the Jotunheim (Giant's Home), a name that reminds us of Thor and the giants in the old Norse legends. The highest peak is Skagstolstind. Next is Glittertind; both are over 8,000 feet high.

Ski-ing in Norway.

What a country for winter sport! No wonder you can see on winter Saturdays at the railway station of Oslo, the Norwegian capital, enormous queues of men, women and children waiting for the electric trains to take them out to the nearest toboggan slides and ski runs. As they stand there laughing and joking with their long skis standing like a forest, they remind you, if you have read Shakespeare's "Macbeth," how Birnam Wood came to Dunsinane. Everybody skis in Norway, it seems; great competitions are held at the ski-ing festivals, especially at Holmenkollen, where extraordinary feats of leaping and swift turning are performed. A good deal of this mountain land is above the snow-line, which is much lower in the Scandinavian Mountains than in the Swiss Alps.



Swedish Travel Association.

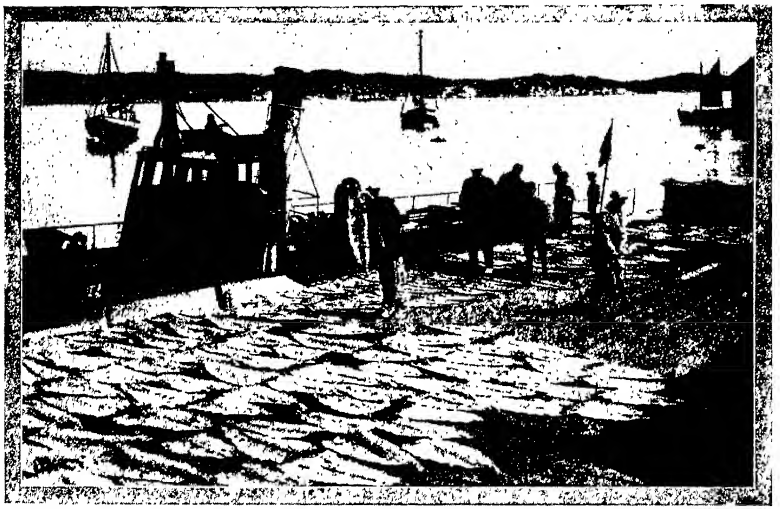
MILKING THE REINDEER

We have seen already that the Laplanders form a sort of gipsy race, roaming freely over many parts of Northern Europe, almost as Red Indians once did in America. Cows are denied the Lapps because of climate, and they depend for milk upon reindeer, which are caught with a lasso. Reindeer milk is rich, but the yield seldom more than a quarter of a pint at a time.

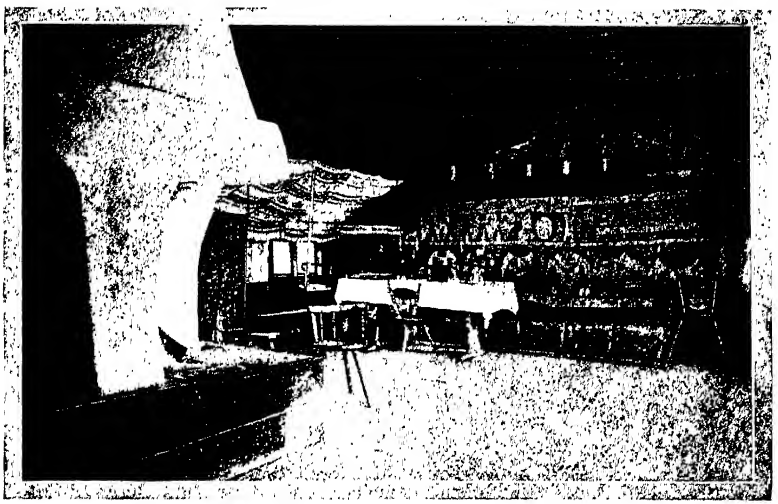
The result is that "winter sport" is possible in many parts during the *summer*. A great ski centre is at Finse, the highest point on the Oslo-Bergen railway, where you will find a rugged stone monument set up to our Antarctic hero, Captain Scott, who carried out a good deal of his training there with his men and his motor-sledges before setting out on his ill-fated journey to the South Pole.

Notice that the Kiolen axis is much nearer the Atlantic than the Baltic, giving Sweden a much longer and more gradual slope, but almost filling the long, narrow country

THE DRYING OF "SWEDISH TURKEYS"



Though fisher-folk are rather less numerous in Sweden than in Norway, the former country has an extensive seaboard and no opportunity is lost of winning the harvest of the waters. Here, for instance, we see what are known as "Stock-fish;" or, more popularly, "Swedish Turkeys," being dried in the sun on a pier belonging to one of the countless harbours.



Photos: Swedish Travel Association.

This picture shows the interior of a peasant's cottage in Sweden. The Swedes are a gay and lighthearted people, and in the country districts old customs survive and picturesque costumes are worn. Stockholm, the capital, is one of the most delightful cities in Europe.

CHEERY FOLKS FROM NORTHERN CLIMES



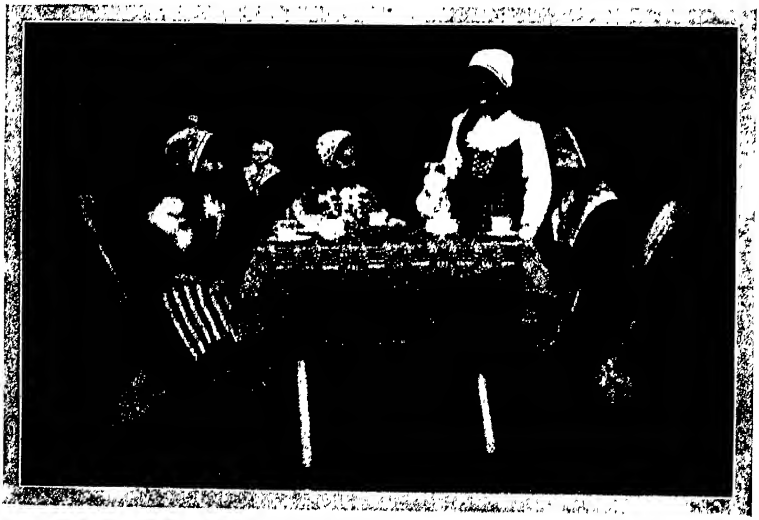
Swedish Travel Association.

Here is a group of young Swedish girls arrayed in national costume. The Swedes devote themselves mainly to agriculture.



Donald McLeish.

During the winter Lapps live in timber huts, shown above, but summer sees many of them gipsying with reindeer-skin tents.



Donald McLeish.

These four little maids have not donned their national costume simply to have their photograph taken, for this is the dress which they normally wear. Their home is in the fertile farming district to be found in the centre of Sweden, and even Dolly is attired to match her playmates. Note the quaint chairs, which look strong, though they cannot be specially comfortable.

BUSY AT HER WEAVING LOOM



Mondiale.

Throughout Scandinavia (the peninsula formed by Norway and Sweden) farms and homesteads are set far apart and shopping expeditions to towns are often long and difficult, especially during the winter months. It is therefore necessary that the people shall be so far as possible self-dependent, and thus in practically every home cloth and materials are woven. Above, for instance, we see a Swedish girl working at a weaving loom to make herself a dress-length.

of Norway with mountains. Norway, indeed, descends steeply into the sea in sheer precipices hundreds of feet high in many places, as tourists who visit the fjords in the summer soon discover when they find their steamer in deep, smooth water close under towering walls of grey and black rock.

Scandinavian Rivers.

Norwegian rivers are nearly all short and swift, except the south-flowing Glommen, which is the only one having a considerable area of land suitable for farming. Swedish rivers, on the other hand, are longer and slower, many coming down from large lakes that keep the rivers in full and regular flow, making them particularly useful in the northern half of the country for floating down the millions of logs from the dark conifer forests to the saw-mills and pulp-mills at the Swedish ports on the Baltic Sea. But although Norway's rivers are too swift for transport purposes, and too full of swift rapids and high falls, they are the sources of electrical power that runs everything—mills, factories, trains and ships—and gives cheap lighting and heating, too, to tens of thousands of homes in town and country. Two very beautiful falls are the Laatefos and the Skarsfos (Fos means "Falls"). The Rjukanfos, 345 feet high, now drives the great power-stations of the famous Norwegian works, where nitrates are made from the air to fertilise the fields of Europe.

Sweden's rivers supply abundant



Norwegian State Railways.

A LAND-LOCKED FISHING HARBOUR OF THE NORTH

The curious objects suspended at the top of this picture do not represent either foliage or decorations, but are the harvest of the sea in the form of fish, opened, cleansed and hung up to dry. On the gridwork of poles immediately below are still more fish, and we see in the harbour the smacks with which the catch was made. This photograph was obtained at a fishing station in the Lofoten Islands, off the north-western coast of Norway.



Mondiale.

FOUR-FOOTED PERAMBULATORS AND MAIL-CARTS

Where there are neither roads nor pavements, perambulators are certainly out of place, but the Lapp mother overcomes the difficulty by pressing into service reindeer chosen for their tameness and docility. Baby is wrapped in a chequered rug, as seen on the left, whilst the older child on the right is safe and sound in a basket. The weight of the youngsters is balanced by bundles.

power, too. One of the most wonderful power-houses in the world is operated by the giant force of the Trolhätten Falls, a few miles north of Gothenburg (Göteborg), Sweden's sea-gate to the North Sea and the Atlantic. Scandinavia has very little coal, but thanks to the abundant "white coal," supplied by the many falls and rapids, both Norway and Sweden can run transport and factories even more cheaply than other countries dependent on coal can run theirs. Even tiny out-of-the-way villages have their electric light and their telephones in many parts of Scandinavia.

The Effects of the Kiolen Axis.

This Kiolen axis, of which we have already said a good deal, has another very important effect. It shuts off Sweden from the warmth and moisture brought by the west winds from the Atlantic, and causes Sweden to tilt towards the Baltic and Eastern Europe. The result is that Sweden has a much more severe winter than Norway; its Baltic ports are sealed by ice, but the Atlantic ports and harbours of Norway are open all the year round. Sweden, too, has much less rain than Norway; Bergen in Norway has more than 80 inches of rain a year, but Stockholm, Sweden's beautiful capital, has fewer than 20 inches.

The winter difference between Baltic and Atlantic ports is well seen in relation to the great Swedish iron-mines of Gellivare and Kiruna, huge open workings of very rich iron ore in Swedish Lapland. This ore must be taken to the sea coast, for a great deal

of it is not used in Scandinavia, but is sent away to Britain and other countries of Western Europe. Electric trains run by power from the great power-station at Porjus go down to the Baltic coasts at Lulea, and also to the Atlantic coast at Narvik. But the ore can be shipped at Lulea only during the summer months, whereas Narvik is busy shipping ore all the year round.

The Norwegian Fjords.

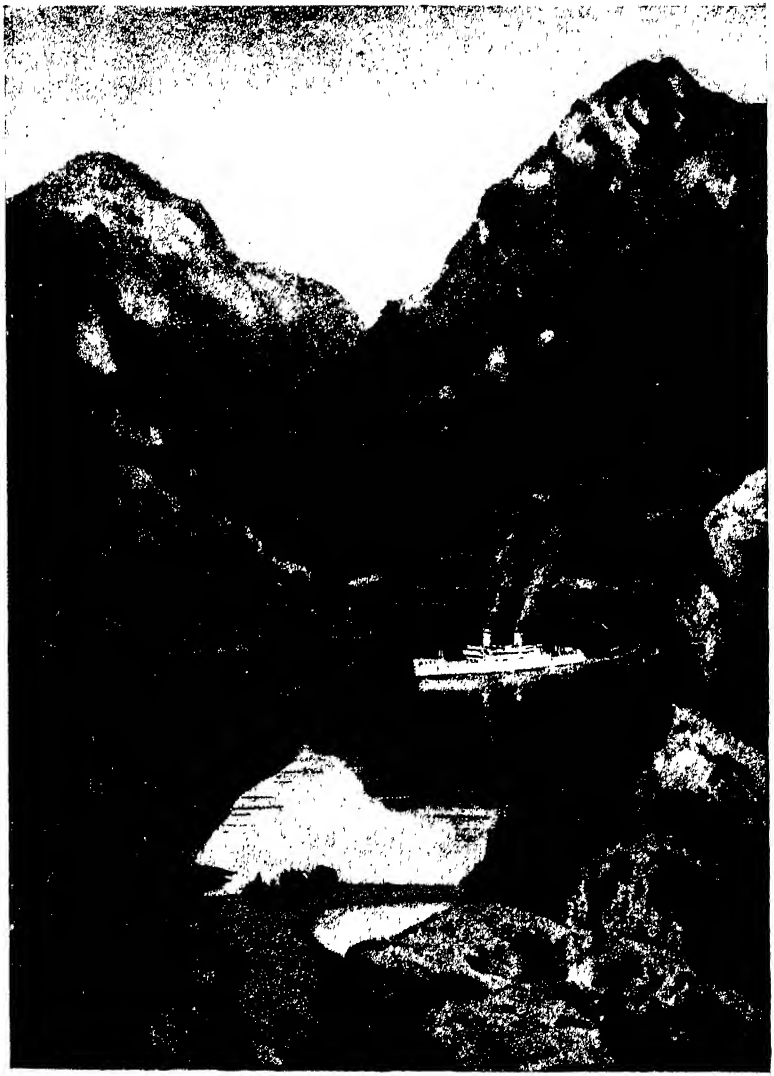
The greatest of all the many attractions of Scandinavia for summer visitors are the beautiful fjords, the longest of which, the Sogne Fjord, penetrates inland for a hundred and six miles from the sea. The coast of Western Norway is cut up into a fringe of close tatters by the fjords, which are often much deeper at their landward ends than at their seaward entrances, so that quite large steamers can go right up, almost to their farthest shores.

These fjords are the result of the slow sinking of the Norwegian coast-line, allowing the sea to flood the deep valleys carved out in former ages by moving ice and running water. Out-standing peaks were surrounded, and now stand in the sea "up to their necks," appearing as the multitudes of islands that fringe the coast, creating behind them an "inner lead" of perfectly smooth water sheltered from the outer sea. The calm waters of the inner lead and the long, deep fjords make a trip to Norway particularly delightful for those who wish to take a voyage without the discomfort that



MOTHER NATURE IN HER GLORIOUS RICHNESS *Will F. Taylor.*

There is a most impressive natural grandeur in this lovely view of Sandven Fjord, a continuation of the famous Hardanger inlet from Norway's seaboard. The field of ice in the far distance is probably a glacier sliding slowly and majestically down the mountainside till its tongue meets the snow line, when it melts into crystal-clear water in the warmer air.



Specially painted for this work.

THE GRANDEUR OF A NORWEGIAN FJORD

Norway is a land of many mountains into which the sea forces its way through deep, winding channels known as fjords, the most extensive of them upwards of one hundred miles from end to end. Our picture affords a bird's eye view of the Geirangerfjord, a Norwegian beauty spot safely reached by large touring liners. Within this fjord are the Seven Sisters Falls and in many places the cliffs are upwards of 3,000 feet in height. If you could travel along this fjord you would find emerald-green valleys, spuming water courses and forests all uniting to form a scene of unforgettable grandeur.

results from rough weather. Once across the North Sea from Hull, or Newcastle, or Leith, the steamer is on an even keel for the rest of the trip, save for the voyage home again, and even that in summer is rarely very bad for people who fear sea-sickness.

Another great attraction for tourists to the fjords is the Midnight Sun, which can be seen at midsummer at all places on and north of the Arctic Circle. Hammerfest is a favourite spot for Midnight Sun hunters, but the sun makes a much braver show at North Cape in the far north of Scandinavia.

Northern Norway, Sweden and Finland are the homes of the Lapps, some of whom are Fisher Lapps and live by the sea, while others are Mountain Lapps, who count their wealth in reindeer and follow the reindeer herds from place to place in search of pasture, returning to their little wooden villages for the winter, but living in tents like true nomads during the summer.



Donald McLeish.

BUILT BY A SWEDISH KING

This castle, so different from the fortress homes we find in our own fair land, was erected in the sixteenth century by a Swedish King named Gustavus the First. It stands in the town of Vadstena, on the shores of Lake Wetter. Sweden possesses many lakes, and her rivers often widen into lakes Canals are also much used for transport and travel.

The Lofoten Islands.

The Lofoten Islands are the centre of Norway's greatest cod-fishing, and during the season the Lofoten banks, above which the swarming cod move in vast shoals that are from 100 to 160 feet deep from top to bottom, are thronged with fishing craft, and the harbours of the islands are packed with vessels that have come there to buy fish for the big markets, especially for Bergen. The fish are split, cleaned, salted and dried on the rocks or spread on high platforms for export. The heads and other refuse are made into fish manure for gardeners and farmers.

The famous Maëlstrom, the dread whirlpool of Edgar Allan Poe's strange tale, "A Descent into the Maëlstrom," is between two of the islands at the southern tip of the Lofoten Archipelago. It is dangerous to small craft.

Just as Norway is famous for fish, so Sweden is famous for timber in the northern half and dairy produce in the south. Norway carries on dairy-farming, too, but farmers there are hard put to it to feed the cows during

the long winter, when they must be kept indoors just as they are in Switzerland. Norwegian farmers treasure every little bit of grass, and even mow it on perilous slopes, sending it down to the valleys by wire ropes. They do not dry it in haycocks as we do, but hang it out to mellow over long rows of wire ropes supported on posts, so that the air and sun can quickly do their work.

The Scandinavian Capitals.

The capital of Norway is Oslo, whence electric trains run to Bergen, the great fishmarket and timber port, to Trondhjem, the old capital, and to Gothenburg and other towns in Southern Sweden. Oslo's most famous street is the Carl-Johans-Gade, which runs from the railway station to the King's Palace on its low hill; along this street the chief places of interest are the Norwegian Houses of Parliament and the Stor-Torv or chief market-place of the city.

Sweden's capital is Stockholm, the "city of granite," built on many islands in Lake Maelar, with its sea approaches from the Baltic guarded by multitudes of rocky "skerries" or islands.

You can travel by water from Stockholm in a fine little pleasure steamer along the Baltic coast to the entrance of the Göta Canal, which takes you right across Southern Sweden by way of the great lakes Wetter and Wener and the Göta River to Göteborg (Gothenburg), facing the Atlantic, Sweden's great commercial port that trades with the whole world.

It is on the Göta River that the famous Trolhätten Falls occur, which we have already mentioned as the site of one of the greatest power-houses in Europe.



Mondiale.

TO MORNING PRAYER BY ROWING BOAT

Norway is a land of fjords and waterways much more than roads and railways, and in many parts travelling is far less irksome by boat than in a motor car. In this picture, as a case in point, the four passengers are being rowed to church on a sunny Sabbath morning. In Holland it is equally the custom to be rowed to church along one of the countless canals.



Mondiale.

LINED UP AND ALL READY FOR THE SKI-RACE

During her long but dry winter Switzerland is a country of ice and snow with most invigorating air, and there are opportunities for many kinds of sport over the white wastes. In this scene a bevy of girls and boys are lined up on their skis, eager for a thrilling race down a snow-clad slope at Adelboden. The word "ski" is of Norwegian origin, and its real meaning is nothing more than "snow-shoe." Some skis have blades 90 inches in length, made from the wood of ash.

SWITZERLAND, THE PLAYGROUND OF EUROPE

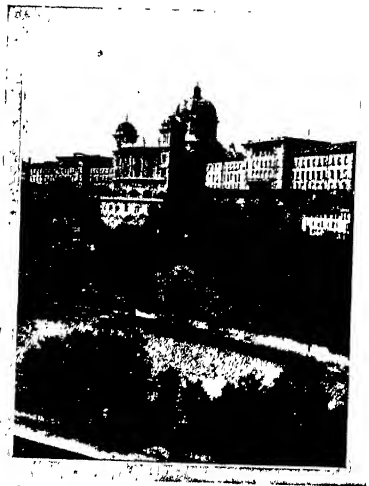
LITTLE SWITZERLAND, the home of liberty-loving mountaineers, and the most prosperous of all the world's republics, in spite of the fact that she is surrounded by great and powerful neighbours, is famous throughout the globe for her beautiful scenery, her quiet peace, and the health-giving mountain air that restores to many a man the vigour he thought he had lost for ever.

No other country in Europe is so much visited by tourists, for no other land can give in the same measure the things for which Switzerland is famous. Her tourist business is the greatest in the world, and many of her people get their living by hotel-keeping, or by providing visitors with things they need on holiday or things to take back home. But apart from all this, Switzerland is a busy farming country and a thriving manufacturing country.

Swiss Farmers.

Farming in Switzerland is chiefly dairy-farming, for there is little land for agriculture, except in the valley plains. The cows are kept on the high pastures during the summer, tended by the farmers' sons and daughters who live up there in their

SCENES AND SIGHTS FAMILIAR TO—



The city of Berne is the capital of the Swiss Confederation, and contains the Federal Palace or Parliament House here depicted. The river in the foreground is the Aar.



During the summer months cows are taken to pasture on the mountains, both milk and cheese being sent to the towns in the valleys. Girls often mind the cows, as seen above.



Photos : Donald McLeish.

The Lake of Geneva, situated between Switzerland and France, is upwards of forty miles in length ; and, on the eastern shore, stands the entrancing Castle of Chillon, seen above. The Castle occupies a small island and is connected with the mainland by a bridge. A château existed here before the year 1200, and we can imagine it still more as a fairy-book palace when we realise that its roofs are formed of bright red tiles.

—THOSE WHO TOUR IN SWITZERLAND



In this picture we are again in Berne, looking through an archway of one of the many arcades. On the right is the Minster, and the fountain is of singular beauty.



This photograph was taken in the Market Street of Berne and shows the huge clock which is a landmark of the city. Above the fountain is the "Armoured Bear."



Photos: Donald McLeish.

Geneva, once the headquarters of the League of Nations, and the third largest city in Switzerland, has long been regarded as one of Europe's great centres. It has played a large part in religious affairs, and this monument, over 100 yards in length, depicts scenes and persons intimately connected with the Reformation, when the faiths of so many countries were remodelled. The monument was unveiled in 1917.

châlets during the summer months, making cheeses or sending down the milk to the towns in tall wooden containers that fit snugly to the carrier's back as he descends the steep slopes. In winter the cows are "stall fed"—kept in their cowsheds which, as often as not, are beneath the living-room of the farm. The Swiss farmer saves every bit of fodder he can for winter use; that is why you may often see men cutting hay on perilous and lofty slopes, gathering it in a wide-meshed net and taking it down to the valley by paths which seem almost too difficult for any living thing but the mountain goats.



Donald McLeish.

A CANINE SAVIOUR OF HUMAN LIFE

Among the Alps of Switzerland, high above the snow line, is the Hospice of St. Bernard, famous for the strong intelligent dogs who go out into the white wastes seeking for lost human beings. The faithful St. Bernard dog here shown with the Prior is named "Turc." He has made no fewer than thirty-five rescues.

Some of the Swiss are foresters and wood-cutters, for many mountain slopes are covered with dense conifer forests whose soft timber is useful not only for building, but also for wood-carving and the making of wooden trinkets, implements, vessels and toys that occupy the long evenings of the dark, cold winters when all the world seems mantled in deep snow.

Swiss Manufacturers.

Switzerland is a manufacturing country, too, although she has little or no coal, and no raw materials to speak of. She has plenty of "white coal," however, in her many waterfalls and rushing streams, and no other land in Europe, except perhaps Scandinavia and Northern Italy, is so well and so cheaply supplied with electric power, light and heat. Her trains are practically all electrically drawn; even small villages have electric light and the telephone, and her mills and factories are mainly electrically driven.

North-eastern Switzerland is busiest in manufactures and textile and metal goods, especially in and around the towns of Zurich, St. Gall and Winterthur. Geneva, the beautiful city at the western end of the lake, and the towns of Le Loche, La Chaux de Fonds and Bienne are all famous centres of the Swiss watch and clock manufacture. Basle, the great frontier town and railway centre, makes fine silks.

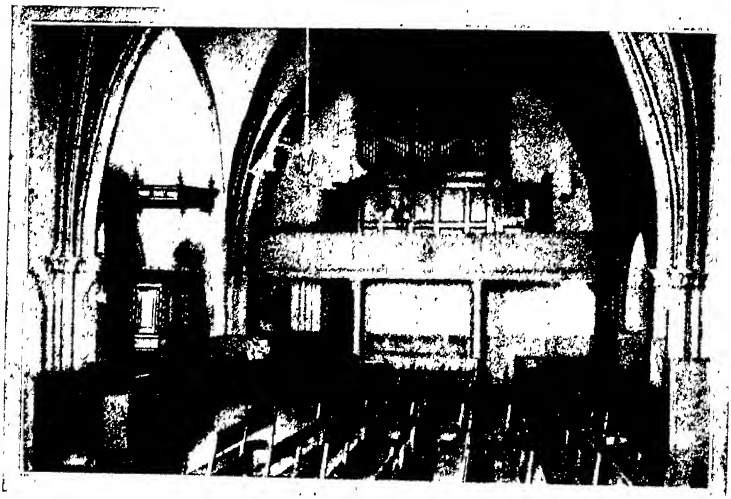
SNOWS OF THE MATTERHORN



Donald McLeish.

This peak is known as the "tooth" of the Matterhorn, one of Switzerland's mightiest mountains, which rears its snow-capped summit nearly 15,000 feet above sea level. The mountain is notorious for its terrific precipices. It has been mastered by intrepid climbers, but many of those who have attempted the feat are sleeping their last sleep in the churchyard of the little town far below.

A PULPIT OF WORLD-FAMED PREACHERS



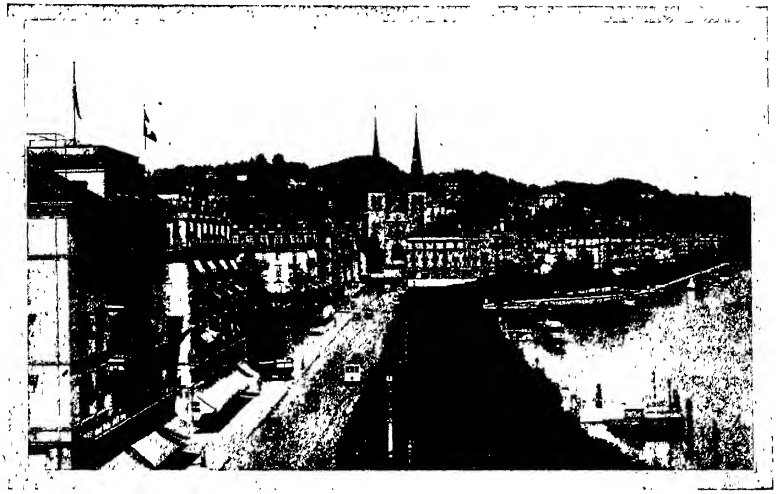
The building here illustrated, with its roof of vaulted arches, dates from the thirteenth century and is known as the Auditoire. It forms one of the centres of interest in Geneva, and here Calvin the great reformer explained his doctrines to the listening world. The famous John Knox, from Scotland, also preached within these walls.



Photos : Donald McLeish.

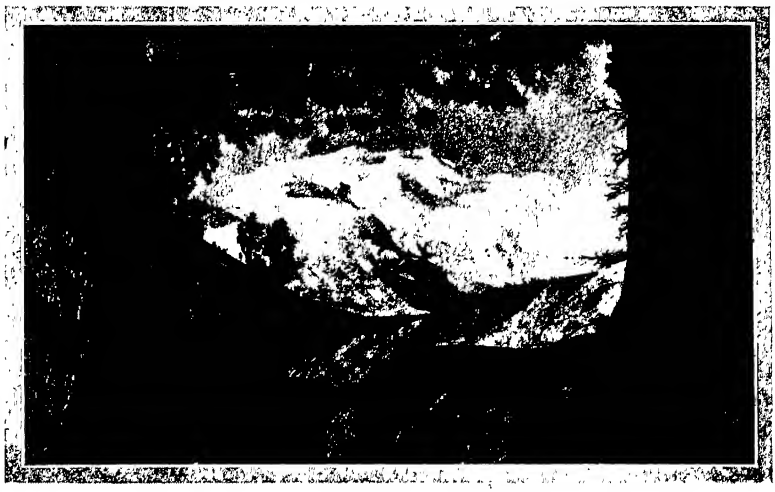
Locarno is a Swiss town standing on the shores of Lake Maggiore and within a short distance of the Italian frontier. It was the scene, in 1925, of a conference between the statesmen of many countries, and the agreements reached were embodied in a document known as the "Locarno Pact." The Pact was signed in this chamber, which has been left undisturbed ever since.

THE ENGADINE OF SWITZERLAND



Donald McLeish.

Most British visitors to Switzerland start their tours from the city of Lucerne, which we see above. The place is named after the beautiful lake, which is upwards of twenty-three miles in length, and in whose vicinity rise the peaks of Pilatus (nearly 7,000 feet) and Rigi. The building at the end of the street is the Cathedral, and we are looking down upon the famous chestnut avenue.



Albert Steiner.

The Engadine is the name given to a district in Switzerland, and the photograph shown here was taken from near the village of Pontresina, in the Bernina Valley This village is nearly 6,000 feet above sea level, and the mountains tower far above even this altitude. It is a favourite tourist resort in summer and in winter.

But the Switzerland we love is the Switzerland of the towering peaks, of the beautiful lakes and waterfalls, and of the deep and mysterious valleys. Lucerne is usually the starting-place of those who are visiting the country for the first time; they can voyage on its deep winding lake, they can ascend the Rigi and Pilatus, which any good walker can manage, and which even people who cannot walk at all can climb in the mountain railways.

The High Alps.

But later they go over into the Grindelwald to see the fine snow-clad peaks of the Bernese Oberland—the Eiger, the Monch and the Jüngfrau, staying either at Grindelwald or at Interlaken, or perhaps at Murren, high perched at its cliff edge above the valley. Mighty glaciers extend their icy tongues down the upper valleys of these mountains of the Oberland, and they and the towering peaks above present fine sport to climbers—and not a little risk. A mountain railway has now been made to enable non-climbers to ascend the Jüngfrau and get the wonderful views which are to be seen up there.

The highest and most difficult peaks, however, lie to the south-west on the other side of the great deep trench of the Rhone valley. Zermatt is the chief centre there; above it towers the grim tooth of the Matterhorn, whose icy slopes and terrific precipices have been responsible for the untimely end of many of those who now lie sleeping in the little churchyard in the town below. To the east of the Matterhorn is the great knife-edge of Monte Rosa, across which runs the boundary between Switzerland and Italy, and far to the west is the French peak of Mont Blanc, "monarch of mountains" in Europe.

This mighty mountain knot of the Alps long proved a serious obstacle to man, though they crossed the barrier by many passes. To-day they have driven giant tunnels through it—the St. Gothard Tunnel between Goeschenen and Airolo; the Simplon (the longest, 12½ miles), between Brieg and Domodossola, the Lötschberg between Kandersteg and Brig, and the Mont Cenis which links France with Italy. Splendid motor roads, too, follow the passes.



Mondiale.

WHERE SNOW SUPPLIES WATER IN WINTER TIME

Though to tourists and visitors the winters of Switzerland are incomparably beautiful, the peasant folk in their homely chalets are not without inconvenience. This girl, for example, is fetching some of the pure snow from the slope near by so that it may be melted to provide water. Though the cold of Switzerland is intense, its dryness makes it a giver of vigorous good health.



E. N. A.

ONE OF THE VERY NUMEROUS CASTLES OF THE RHINE

The most important river in Europe, the Rhine, rises in Switzerland, flows between France and Germany, through the latter country and then across Holland. In this picture we see the Castle of Maus, with the townships of St. Goar and St. Goarshausen beyond. People have travelled from all parts of the world to see the wonderful views along the banks of the Rhine.

THE RHINE AND THE RHINELAND

IN the very heart of Switzerland a great glacier protrudes its icy tongue down a high valley. As it melts a stream of water runs away in a turbid creamy flood down the valley past tiny villages of wooden houses, until it is joined by another stream that has come from the Adula group of mountains farther south.

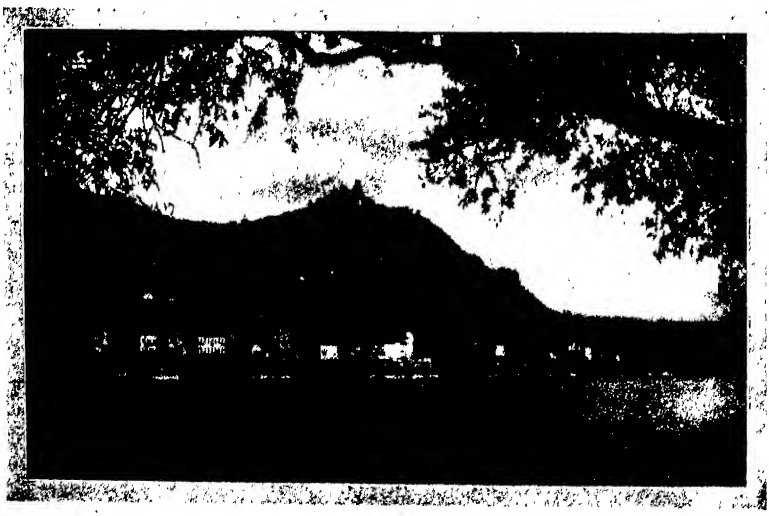
You would never think, to look at them, that either of these mountain streams was of any great importance; and even after they have joined their insignificant floods near the small town of Tamins, the river thus formed is just like hundreds of others in this beautiful mountain land, flowing swiftly through deep valleys, pausing a little where grassy flower-covered meadows invite it, and flowing cheerily beneath wooden bridges where the villages of Swiss herdsmen and mountaineers snuggle comfortably in the valley bottom under the protection of their big white churches, each with a spire that is like a fat bottle-stopper at the top.

A Mighty River.

Yet if you follow this river from its wild home among the mountains to the sea, you will find that your respect and admiration for it grow as the river increases in beauty and importance, until you realise that this mighty flood, bearing a bigger load of commerce than any other river on the continent, is one of the most wonderful things in the world.



All along the banks of the Rhine are great castles, such as Burg Sooneck, seen above, with a view of Toteninsel beyond. Some of these strongholds of the Middle Ages are in ruins, and many of them were inhabited by robber barons who levied toll on all who passed, whether by road or river, boldly defying the rulers of the country.



Photos : E. N. A.

This view is taken from the level of the Rhine and shows the town of Königswinter. The mountain beyond is the Drachenfels, with a castle as its crown. In the story of the great opera, "Siegfried," the hero slays a dragon who lived in a cavern on the Drachenfels, the word meaning "Dragon's Rock." The district is also described in Byron's "Childe Harold's Pilgrimage."

—ALONG THE BANKS OF THE RHINE



In its central portion particularly the mighty river Rhine has some of the most magnificent scenery in the whole of Europe, and the landscape above is typical of the cameos that would delight our eyes if we could visit these parts. The building perched so prominently on its towering crag is Burg Rheinstein. It makes one think of the castles which figure in fairy tales.



Photos: E. N. A.

Instead of merely a cameo, we have in this picture a considerable stretch of the River Rhine, showing how it winds placidly along its appointed course from the icy tongue of a glacier in a Swiss mountain to the sea off the coast of Holland. The building in the foreground of this delightful panorama is the Schloss Stolzenfels.

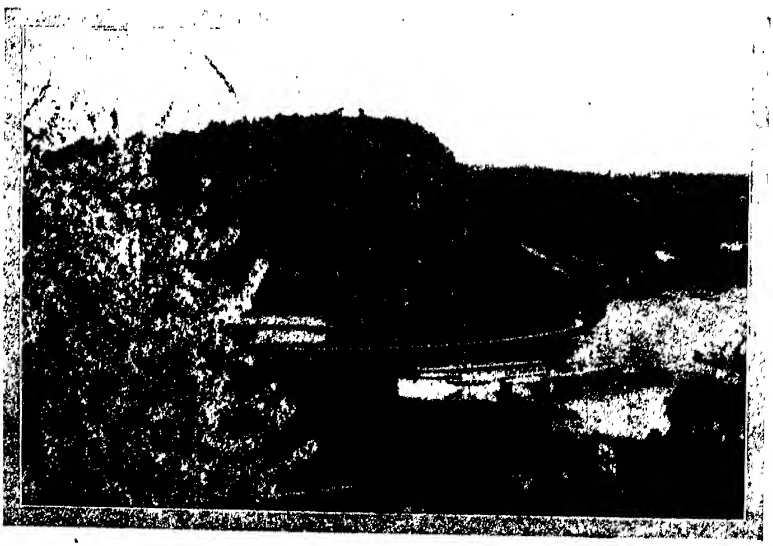
For this river is the Rhine, the most important river in Europe, with many great cities in its basin, which is rich in most of the things that go to make a land the home of large numbers of people. It turns the great turbines of monster power-stations in Switzerland and South Germany, it carries down the timber in great rafts from the forests that clothe the mountains, it bears an incredible number of big barges—thousand-ton and even two-thousand-ton barges in strings of two or three towed by powerful tugs—and gives large steamers passage inland for hundreds of miles from the sea.

One of the tributaries which join it in the lower half of its course has in its basin the richest coal-field in Europe, and a number of giant town-clusters which are for ever busy manufacturing iron and steel goods of all kinds, dyes and chemicals, and textile goods of every sort, to supply the markets of the whole world. That tributary is the Rühr. We must look at it more closely presently.

Rhine Scenery.

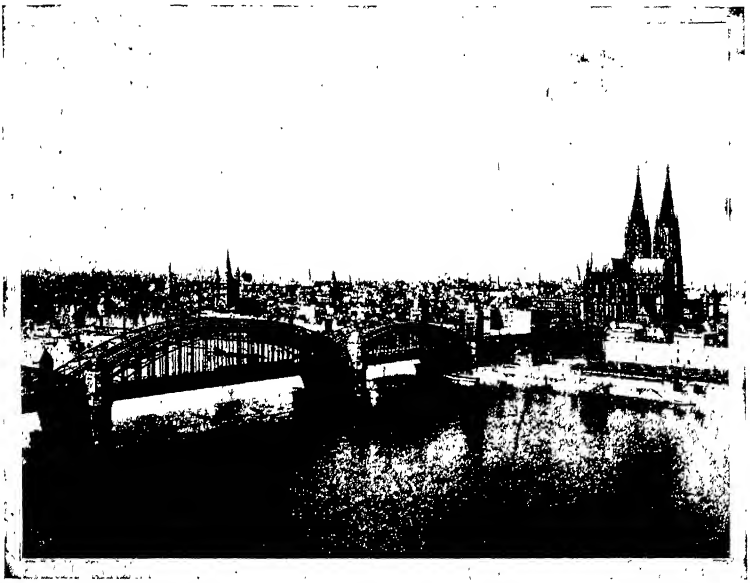
Along its banks the Rhine has some of the most magnificent scenery in Europe, especially in the middle course, where during long ages it has sawn a deep gorge through the block of old hard plateaux known as the Rhine Highlands, and where it flows in a deep and mighty flood between high, steep banks terraced to their very crests with orderly vineyards, and crowned on the topmost crags with the ruins of great castles that were the strongholds of robber barons who in the Middle Ages defied kings and emperors and took toll of all who passed, whether on land or water.

In times of peace, this part of the



THE WINDING RIVER, AS SEEN IN SPRINGTIME E. N. A.

Here is a bend of the Rhine, as snapped in the spring season, with fruit trees in the full splendour of their blossom. The size of the passenger steamer rounding the bend brings home to us to what great use the broad stream is put for transport purposes. On the opposite side the hard, high bluff is the well-known Lorelei Rock. In German fairy tales the Lorelei sang to lure passing travellers to their doom.



German Railways.

A BIRD'S EYE VIEW OF THE CITY OF COLOGNE

In this impressive picture we are again looking down upon the Rhine at Cologne. On the right is the tall Cathedral, and the place was noted for its fine bridges. Cologne, like many other Rhine towns, suffered heavily from air bombardment during the World War, and in common with most of the other Rhine bridges the one shown above was almost completely destroyed.

Rhine is much visited by tourists, not only from every part of Europe, but also from America, for its fine scenery is worth coming half across the world to see.

The Dutch Rhine.

When you reach the rich meadow-lands of Holland, where the two arms of the great Rhine wind placidly under its Dutch names of Lek and Waal, you realise that all this rich densely-peopled country has been built up through the long ages from the silt brought down by the Rhine. For Holland is made largely of soil torn from its parent rock among the mountains of Switzerland, ground into fine sand, and carried for hundreds of miles by this great river, to be deposited on its mouth in the delta that forms most of Holland.

If you follow the Lek, the chief mouth of the Rhine, you come at length to many neat Dutch towns surrounded by their pasture-lands and flower-fields to the great seaport of Rotterdam, whose fine docks shelter the ships of the nations, and whose works, factories and mills gather their raw materials from all parts of the world; but especially from Dutch colonies in the East Indies and from Dutch Guiana in South America. Cocoa and chocolate factories, sugar refineries, rubber factories, oil works, margarine factories and ship-building yards are Rotterdam's chief business enterprises.

The long, deep, straight waterway from Rotterdam to the sea has been made partly by the Dutch themselves, who have dredged out and straightened the bed of the Lek to admit the largest

ships afloat. They call it "The New Waterway." At its seaward end is the packet-station of the Hook of Holland, the port for the L.N.E.R. steamers that in peace time run from Harwich, carrying passengers and the mails from Britain to all parts of Middle Europe.

The Rhine on the Map.

If we now turn to our atlases and look at the Rhine and the Rhineland, we shall see clearly how the river is divided. First, there is the *Mountain Rhine* rising in Switzerland, flowing through the large Lake Constance (over which Count Zeppelin flew his first zeppelins, and where great experiments with aircraft were carried on), and on past the beautiful Falls of Schaffhausen to the important Swiss frontier station of Basle—perhaps the biggest railway station in Europe.

At Basle the Rhine turns northward, flowing through a deep but wide and flat valley, between the dark mountain forests of the French Vosges on the left and of the German Black Forest on the right, until you come to Mainz, where the Main flows in from Bavaria and the German Jura. About half-way is the big river port of Mannheim, where the river Neckar that has come from the Black Forest past the beautiful old university town of Heidelberg, joins the Rhine.



E. N. A.

GERMANY'S PARLIAMENT HOUSE

Among wireless broadcasts and in our newspapers we often meet the word "Reichstag," which means simply the Parliamentary House, from whose inner chambers Germany was once ruled by representatives of the people. The German Reichstag was destroyed by fire, purposely it is believed, shortly after Hitler gained a measure of control.

The third division is the *Rhine Gorge*, which the river has cut deeply through the Rhine Highlands between Bingen and Bonn. At Bingen you can still see the mouse tower in which Bishop Hatto, the profiteer in grain of his day, according to an old legend, took refuge against a swarm of advancing rats. On the way down to Bonn you pass the high rocks, where the Lorelei—the sirens of German fairy tales—sang to lure voyagers to destruction.

Coblenz and Cologne.

Soon after you see the great commercial city of the Middle Rhine, Coblenz, with its fortress of Ehrenbreitstein frowning down from the heights on the opposite side of the river. Most famous of all the castles of the Rhine Gorge is Drachenfels, high perched upon the "castled crag of Drachenfels," famed in old song and story.

Beyond Bonn the valley opens out into a wide and fertile plain in which sit

SEEN FROM THE LUSTGARTEN



German Railways.

In this picture we see the front of the Cathedral of Berlin, which was elaborately ornamented in statuary and other embellishments executed in the Italian Renaissance style. Adjoining the Cathedral was a beautiful square, planted with trees and flowers, known as the Lustgarten. Berlin is a city built on a sandy plain through which flows the River Spree. Like other big German cities, Berlin was practically reduced to ruins before the end of the World War.

Cologne with its tall cathedral and fine river-bridges, and other great cities where factories smoke and busy industries flourish. The fifth part of the Rhine is the delta, which is Southern Holland. Each of these parts of the Rhine has its own distinctive features and its own people living in the ways best suited to their homeland.

What countries belong to the Rhineland? Switzerland is the home of the Rhine; from Basle for many miles northward the Rhine forms the boundary between France and Germany; some little distance north of Strasbourg, the capital and cathedral city of Alsace, which was restored to France as a result of the Great War of 1914–18, the Rhine becomes entirely German for hundreds of miles to Emmerich, near the Dutch frontier.



Will F. Taylor.

THE EMPEROR'S PALACE, BERLIN

Berlin has been much changed since 1939 by air bombardment. After 1919 many of the former royal palaces were converted into public offices, galleries and show places. Our picture illustrates the entrance to the one-time residence of William II, the ex-Emperor of Germany, who died in exile in Holland.

The Dortmund-Ems Canal.

For ages the Germans have looked upon the Rhine as *their* river, but other nations, and, indeed the whole world, are directly or indirectly concerned with it, as we have seen. The Germans, however, have constructed an all-German exit for the Rhine to the sea, so that traffic need not pass through Dutch territory. This is a great canal from Dortmund on the busy Rühr coal-field to the north-flowing River Ems, which enters its North Sea estuary at the port of Emden, one of Germany's submarine and destroyer bases. Barges from the Rühr can reach the seaport of Emden by the Dortmund-Ems Canal, instead of going down the Rhine to the Dutch port of Rotterdam, but Rotterdam is so convenient that most of the Rhine cargoes come and go that way.

Have you ever read the story of the Nibelungs and their treasure? Of the Rhine gold seized by wicked Hagan and sunk beneath the Rhine so secretly that when he died no man knew where the treasure was

hidden? If you have, you will remember that in this tale, and in many others that are the common heritage of the Teutonic peoples of Europe, the gnomes of the underworld appear — the busy dwarfs who got out the metal ores from the rocks and from them welded mighty swords and invincible armour for the heroes.



German Railways.

OLD HOUSES AT FRANKFORT

Frankfort, which stands on the River Main, is a typical old German town. It possessed many quaint buildings, such as those shown above, and was at the same time a centre of commerce and banking. Frankfort was the birthplace, in 1749, of Germany's greatest poet, Johann Wolfgang von Goethe.

The Busy Rühr as it was in 1938.

When one visited the Rühr in the days before the war of 1939–45 one could have seen working in metal carried on on a scale equalled hardly anywhere else in the world, and there came the wonder whether the old stories were in a way prophetic of what is happening there to-day. Six million tons of iron were smelted there every year, and eight million tons of coal were taken from the coal-mines—the work of at least two millions of men. No wonder that twelve of Germany's towns with populations over 100,000 were in the Rühr basin!

It was most startling to go through this Rühr country at night. It reminded one of the vast iron-smelting and steel-working regions in England—of Middlesbrough and Sheffield.

Great licking tongues of flame darted from the mouths of the tall blast furnaces, throwing into staring black reality the grim masses of factory buildings, gaunt chimneys, rolling-mills, pit-head gears, and railway waggons. Over these a white glare as of a million electric lamps shivered and pulsed, making a patch of high noon in the black of midnight. That was the glow from a blast furnace newly tapped, its river of white-hot metal flowing down from the unplugged taphole into the long moulds in which it turned first a flaming crimson, then a sullen red, as it cooled to form pig-iron.

By day the sky was shrouded with the smoke of a thousand tall chimney-

TO BE SEEN IN GERMANY



German Railways.

The Bavarians are among the most virile and admirable of the peoples of Germany. Above is a guide of the Bavarian Alps.



German Railways.

The Rühr is a tributary of the Rhine, and the Rühr valley, shown here, is particularly rich in coal and iron.



E. N. A.

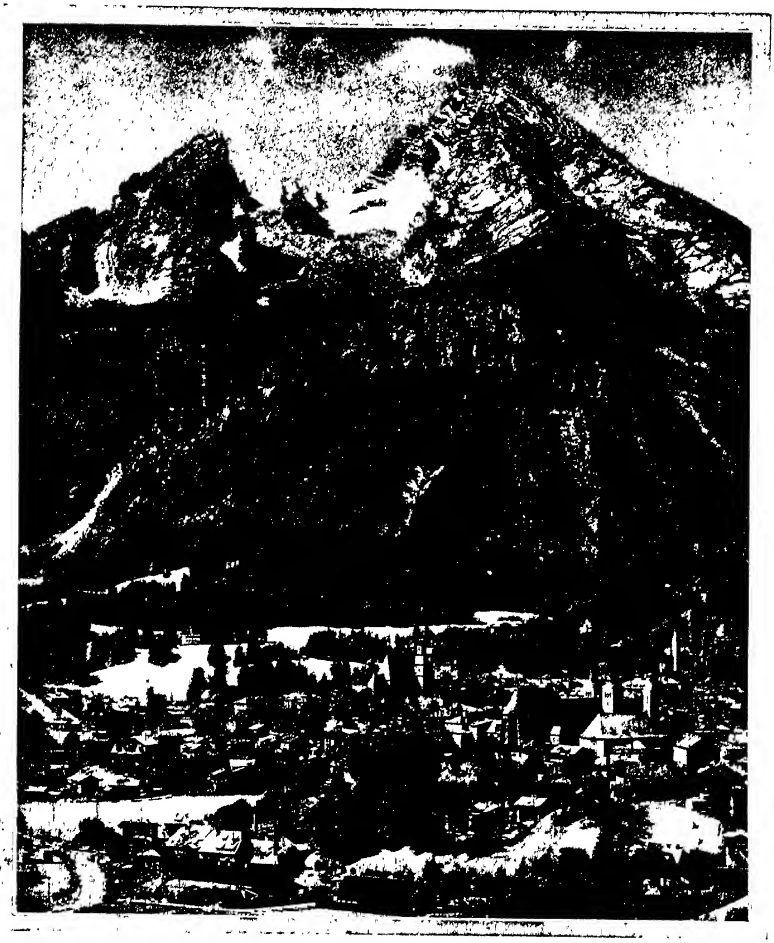
Nuremberg was a delightful old city in Bavaria and was at one time famous for its toys. Here we see the Church of Our Lady, which stands in the Market Place.



E. N. A.

Hamburg, now much damaged, is situated on the Elbe and is the largest seaport in Germany. Through these arches we are looking at the Rathaus, or Town Hall.

UNDER THE WATZMANN'S SHADOW



German Railways.

The little town clustering here at the foot of the Bavarian Alps is Berchtesgaden, which is visited by tourists from all parts of the world. The peak behind the town is known as the "Watzmann," and there are lovely lakes in the vicinity. Though from the photograph you might think the town was in a low situation, it actually stands 1,700 feet above sea level. The mighty Alpine peaks separate Bavaria from the district known as the Austrian Tyrol, and the country is to a considerable extent covered with dense forest-land, in the glades of which animals of many kinds still roam. Further, these widespread wooded tracts offer scope for game-hunting on a particularly large scale, the wild boar being the most frequent object of the chase. It was at Berchtesgaden that Hitler had a home.

stacks, and at certain hours the screeching, hooting chorus of whistles from pithead, factory and mill reminded us of ships fog-bound in Thames' mouth some thick November day, when each and all, from humble barge to lordly liner, lift their voices in protest against the blindness that has come over them.

The Steel Works of Essen in 1938.

Peep into the great steel works at Essen—and watch those men—pigmies beside the machines they handle, and the vast black caverns where they labour—filling a giant ladle with molten steel. It holds at least sixty or seventy tons. The steel flows in a blinding glare that seems hotter than the sun. The workers wear special eye-shields to withstand that terrible hot brightness.

The ladle is filled, and moves forward, slung invisibly from a moving platform high in the girdered roof, away up there in the blackness. It pauses over the first of a long row of tall moulds, each with a steel loop on its rim-like ears, by which the moulds are lifted when the steel has cooled. Suddenly a valve opens in the bottom of the ladle; there is a sudden glare of hot white light as the molten steel comes plunging down into the mould, spluttering brilliant stars where a thin stream of it licks the edge, and scattering fireworks in glad display. Mould after mould is filled, and left to cool. The ingots—ten tons each of them—will be sent to the soaking-pit and made white-hot again; then they will pass to the rolling-mill to be crushed and squeezed and rolled backwards and forwards through its roller-jaws until shaped into a steel girder, a stanchion, a rail

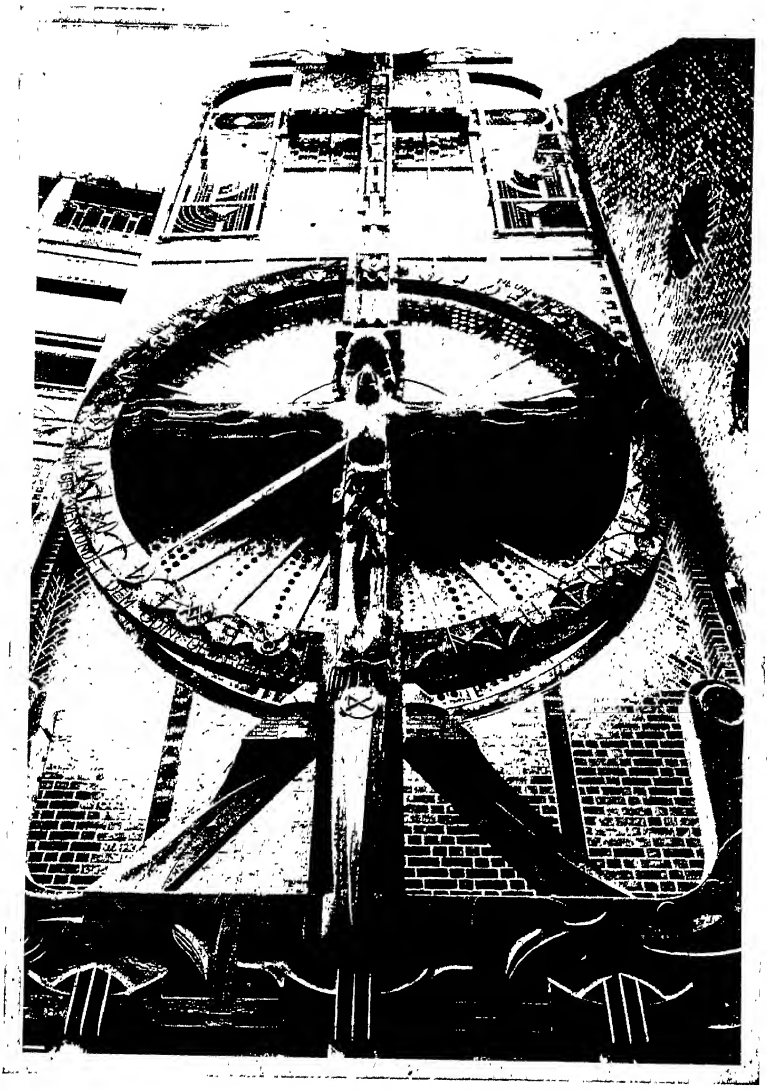


Mondiale.

UP AMONG THE BAVARIAN HIGHLANDS

Bavaria shares with Italy and Austria that part of the Alps known as the Tyrol. The Tyrolese are a most romantic and hardy people, and we are here shown the view from the Post Inn at Fischbackau. The building on the right with its curious tower is, of course, the Church. Adjoining come the offices of the Commissioners of Forestry, who play an important part in managing the affairs of a district so rich in timber.

A BUILDING TELLS A STORY



E. N. A.

Bremen is an ancient and important German city, considered to possess the "most wonderful street in the world," a thoroughfare in which every building was intended to typify the best in the art of Northern Germany. The centrepiece in the building here illustrated is the figure of the mythical Odin, who dies each year just after Christmas so that a New Year may be born.

FISHING AND FARMING IN GERMANY



These wader-clad and hardy looking fellows are typical of the fishermen we should meet in East Prussia. They have just landed two fine hauls of carp by means of a net fastened across a swiftly running stream, and we must hope they were well rewarded for their arduous labours.



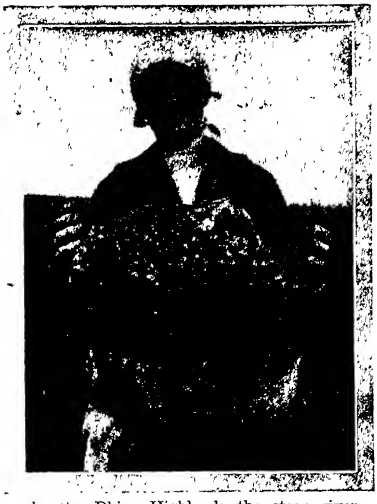
Photos: E. N. A.

One might think from this picture that women do most of the work on the land in Germany. Women certainly do play an important part in the husbandry of the Fatherland, but these girls are students at a large farm school at Wasselburg, in Bavaria, starting for the day's duties.

VINEYARDS OF MOSELLE



This old lady makes her home in the Kahlberg district of East Prussia, and finds employment at a primitive establishment where eels are dried for food by a process of smoking.



In the Rhine Highlands the steep river banks are terraced with vineyards. Here is a vineyard worker of the Moselle district bringing in a tub of luscious grapes direct from the vines.



This little German girl is munching one of the monster flat biscuits which make their appearance at Eastertide in the Spreewald district of her native land.



Photos: E. N. A.

The trio here depicted represent German children such as one might meet if travelling in East Prussia. Note the curious cap worn by the little boy,

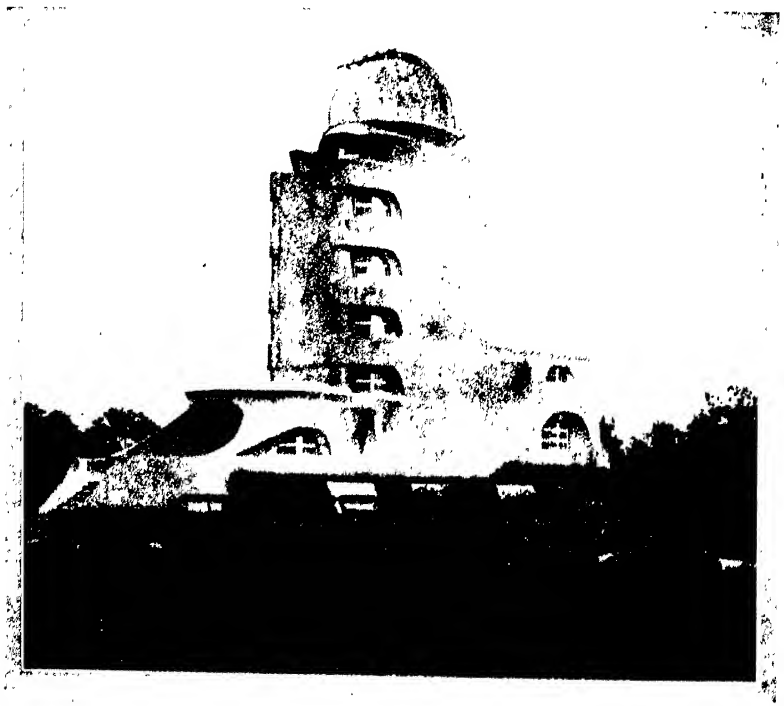
for the railway, a tramline, or something of the kind. This was the Rühr as it was before the war devastated the whole area. Of its future it is unwise to prophesy. It may be that on the ruins Germany may again build up a new greatness, inspired by higher ideals that those of her former leaders.

Cities in Ruins.

Beyond the Rühr are the broad and fertile fields where sugar-beet and tobacco, barley and rye, and huge quantities of potatoes are grown; the grass lands full of grazing cattle, horses and sheep, and the great cities of the fertile plain of North Germany.

There are, too, the forests and rivers of the south, from whose highlands the rivers run down to the manufacturing towns of Saxony, and the old cities of Dresden, Leipzig and other famous towns, so many of which suffered heavily during the World War of 1939–45.

So far as the capital is concerned, Berlin is a huge city built on a flat, sandy plain with just one hill. When the end of the war came it was a city of ruins.



E. N. A.

A VERY MODERN TOWER OF BABEL

Potsdam, prior to the War period of 1914–18, was to Prussia what Windsor is to Great Britain and Versailles was to France—the country seat of the Emperor. The glories of the town, with its royal palaces, have gone, but we may see there to-day this "Babelsberg," or Tower of Babel, known as the Einstein Tower and named after the great German scientist.



Will F. Taylor.

HAPPY, CAREFREE GIPSIES OF THE EAST

All the world over there are gipsies or wanderers. In North America were once the nomadic Red Indians, and on the shores of the Arctic Lapps abound. Here we see an encampment of gipsies in Bohemia, a country which forms part of the German Reich, coming north-east of the mighty River Danube.

FROM BLACK SEA TO BLACK FOREST

A VOYAGE across the middle of Europe from the Black Sea to the Black Forest hardly seems possible, until we look at the map and see for ourselves how the great Danube, the water-highway of mid-European nations, makes it possible.

This mighty river joins the East to the West. We can begin our journey from the Black Sea and travel for hundreds of miles past lands in which Moslem mosques and Moslem customs speak plainly of the East; and then at the Iron Gate comes a change, that is almost sudden, to the people and customs of the West. For in Western Europe people get about so easily and so often that it is only in remote country districts that the old national costumes still linger on; but east of Vienna, which is the "Paris" of Middle Europe, strange and beautiful forms of national dress are quite common. In the West people merely dress, but in the East of Europe people wear costumes.

The Danube on the Map.

Let us look at the wonderful River Danube as it appears on the map.

The Danube is more than double the length of the Rhine; the only river in Europe that is longer is the Volga. The Volga flows through one country, but the Danube serves many lands and many different nations on its long 1,800 miles journey from the Black Forest to the Black Sea.

The Danube rises in Germany and

flows across Bavaria, making its way into Austria through a gorge which is known as the "Austrian Gate," guarded by the fortress-city of Passau, where the Inn joins the Danube from the snow-peaks and dark forests of Tyrol. The river flows through Northern Austria, past Austria's former capital of Vienna, and then for some miles it forms the international boundary between German lands on the north and Hungary on the south. Here stands the Slovakian river-port and old fortress town of Bratislava, which before 1914 was known by its Austrian name of Pressburg.

Now the Danube turns abruptly south round a steep high hump of the Bakony Forest and through a gap between these hills and others to the north-east, and passes the double city of Budapest, the capital of Hungary, where many railways meet from many directions. Next the river flows across the great Hungarian plain, sometimes dividing into a number of streams, and then joining them again to form one, and often slipping quietly over dangerous shallows which must be well known to all the Danube men who navigate the cargo boats and passenger steamers for 1,600 miles along it.

The Iron Gates.

Now the river has left Hungary and entered the kingdom of Yugo-Slavia, flowing past its capital of Belgrade, which stands at the spot where the great tributary Sava joins the main stream. Turning eastward, the Danube makes its way between the Transylvanian Alps and the Balkans in the



Mondiale.

FLOATING FLOUR MILLS OF THE DANUBE

Through parts of Rumania and adjoining the great Hungarian plains where rich cornlands abound on every hand the floating flour mill is commonly seen. Each of the mills forms a home for the miller and his family; and it is the strong-flowing water of the river, acting upon broad paddle wheels, that turns the stones which grind the corn.



Mondiale.

A RIVER ISLAND OWNED BY THE TURKS

Not very far from the " Iron Gates " in the course of the River Danube, and midway between the shore of Rumania and that of Serbia, comes the Turkish island of Adakaleh, from which this photograph was taken. The ruined masonry at the landing stage is that of the ancient fortifications.

stupendous gorge of the Iron Gates, where the river swirls and foams in a hurrying flood past the teeth of black, jagged rocks with which the bottom of the gorge is sown. Ships avoid the dangers of these rocks and rapids by using the canal-like sheltered channels constructed in the river-bed at enormous cost. Once through the Iron Gates, the Danube for several hundreds of miles forms the boundary between Bulgaria on the south and Rumania on the north. The Bulgarian bank is high and steep; the Rumanian is low and marshy, and speckled with lake-like expanses that are really the old cut-off loops of the river. Notice on the map how town faces town at many points along this part of the river, one Bulgarian and the other Rumanian, on the opposite side.

The Lower Danube.

At last the great river makes an abrupt turn northwards, for a low, dry plateau of limestone called the Dobrudja—the home of countless sheep and goats—bars the way. The Danube is now altogether Rumanian, flowing north to the big grain and timber ports of Braila and Galatz, and then bending at right angles to enter the Black Sea by several mouths in its wide, marshy delta. The chief of these is the Sulina mouth, with the port of Sulina at its exit, where two very long jetties have been built to confine the Danube flood and force it to keep its channel well scoured out and deep enough for the ships entering the river from the Black Sea.

An International Waterway.

Here is a river that wanders for

1,800 miles across Europe, with 1,600 miles of it navigable for barges and small steamers. The Germans, the Austrians, the Czecho-Slovaks, the Hungarians, the Yugo-Slavs, the Bulgars and the Rumanians all have an interest in this great waterway, which is to them the best and cheapest means of transport for the things they sell and the goods they buy, as well as a pleasant and economical way of getting about in the summer-time to and from all points along its course between the Black Sea and Germany. It is the great waterway that links Eastern to Western Europe—the natural highway of the many nations who live in the Danube lands.

Which of these nations is to rule it, to care for it, to ensure free and safe navigation upon its broad bosom? There was only one way to settle this important question, and that was to make it an international highway—everybody's river, but nobody's in particular! To ensure that the river is kept in order, with its wharves and quays, its lights and buoys and canals all in proper working condition, and to make certain that all who wish shall have freedom of navigation along it, a great international committee called the International Danube Commission was appointed, and in 1921 special laws and regulations were drawn up to guarantee freedom of navigation to all the nations living in the Danube basin. But the Axis Powers and their friends did much in recent years to prevent the Danube becoming what Nature always intended it to be—the highway of the nations of Middle Europe—by endeavouring to obtain too many of its advantages for themselves.



Mondiale.

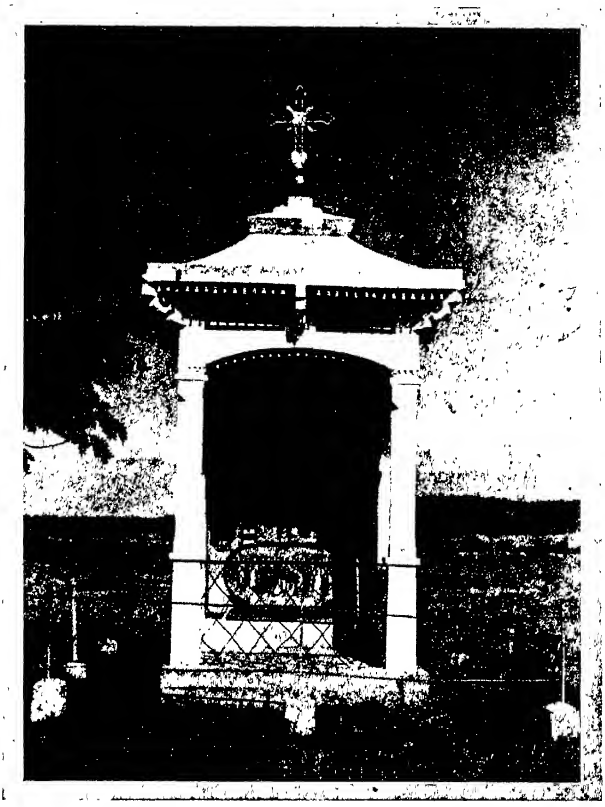
WHERE THE OLD FACES THE NEW

In this picture we see a modern office building, up to date in every respect, set side by side with a very ancient church. Many other strange contrasts may be found in the city of Bukarest, the capital of Rumania, which is fast being modernised with the development of business premises and the forming of boulevards.

Linking Danube and Rhine.

There is only one thing we ought to know before we set out on our voyage from the Black Sea to the Black Forest, and that is the existence of a waterway from the upper Danube to the busy Rhine. This is a newly widened and deepened canal which leaves the Danube not far from Regensburg in Bavaria, and cuts across through Nürnberg, once "the city of toys," to Bamberg on the upper Main, which is the big tributary flowing past the beautiful

city of Frankfort to join the Rhine at the important river port of Mainz. This canal is Ludwig's Canal; the Germans have spent huge sums of money in widening it and deepening it to take very large barges; for, linking Rhine and Danube as it does, it makes possible a great water highway right across Europe from the North Sea to the Black Sea.



Mondiale.

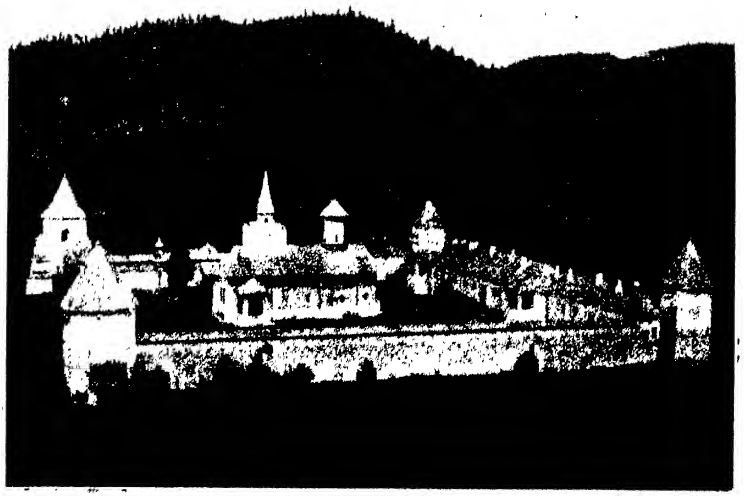
A PLACE OF PRAYER FOR THE PASSING WAYFARER

If you were travelling through Rumania you would find at frequent intervals along the important highways simple places of prayer like the one here depicted. The Rumanian shores of the River Danube are low and marshy, broken by many lake-like inlets, but the Bulgarian bank on the opposite side is steep and high.

A Voyage up the Danube.

We enter the Danube from the Black Sea through the Sulina mouth, and make our way up through the wide delta lands and reedy marshes to Galatz and Braila, the great Rumanian river ports crowded with big Danube barges and large and small steamers, huge rafts of timber, oil tankers and grain boats, which tell of the dense forests of the Carpathian slopes, the important petroleum wells along the foot of the Eastern Carpathians, and the fertile grain-lands of Wallachia.

We could, if we chose, leave the river at Braila and take a train journey over the plains to Bukarest, the beautiful Rumanian capital, rejoining our river boat at Giurgevo, which has the Bulgarian port of Rustchuk directly opposite it. For 200 miles west of these ports the Danube forms the boundary between Bulgaria and Rumania, and the slender minarets of Mohammedan mosques on the Bulgarian side remind us that people of the Moslem faith live in the riverside towns there. We lose sight of them directly we get through the Iron Gate



Mondiale.

A MONASTERY AMONG THE WILDS

The Monastery of Suvevitza in Bukovina, Rumania, as we might look down upon it if gliding over the rugged country in an aeroplane. Guarded by its four corner towers and massive wall, and with its simple Church in the place of honour, this establishment of peaceful, learned monks seems remote from all the world.

—a passage made possible only because walled deep channels have been constructed in the bed of the river. On either side we can see the wild swirl of rushing waters amid which navigation would be impossible. In the old days, boats had to be dropped by main force by great gangs of men, the vessels hugging the shore as closely as they dared. But in 1878 the rapids were subdued, partly by blowing up the rocks in the channel, but chiefly by building the canals.

Trajan's Pass.

The gorge itself is shut in by high rugged walls of rock, on which at one point we can still see the deeply-cut inscription in Latin recording the passage of the armies of the Emperor Trajan through this stupendous cleft —a passage rendered possible only by the building of great platforms supported by wooden beams in the rock face above the swirling flood.

This reminds us in addition that far behind us downstream there still remains enough of Trajan's wall between Constanta (the Rumanian oil and passenger port on the Black Sea) and the Danube to prove how hard a fight even Trajan must have had to keep out the Visigoths who already had begun to hammer at the outer gates of the Roman Empire.

Belgrade.

Through the defile of the Iron Gate, which is guarded by forts on both sides, we breast the wide, swift river and make our way upstream across a corner of the rich plain of the Banat to Belgrade, or Beograd as the people call it, perched high on its rocky hill

CLIMBERS OF THE ALPS



Photo: E.N.A.

Mountaineering is one of the most thrilling and manly pursuits, calling for a great deal of pluck, skill and endurance, and usually the services of an experienced guide. The two young men seen above are typical mountaineers. They are resting at the well-known Taesch Hut, which overlooks the Matterhorn. This famous peak, 14,800 ft. in height, is in the Alps, on the boundary between Italy and Switzerland.

FORGING A PATH THROUGH ICE AND SNOW



Here we see the Allalinhorn, upwards of 13,000 ft. high. The roped climbers are crossing a field of snow that forms the remains of an avalanche.



Amidst the ice and snow, crevasses of enormous depth are to be found. The climber on the left is preparing to jump a crevasse on the Pilatti Glacier.



The lowest of these three mountaineers has had a slip on an icy slope at a height of 11,000 ft. His life has probably been saved by the ropes and ice axes.



Photos: Donald MacLeish

This is a scene characteristic of the Swiss Mountains and was taken on a glacier in the Eastern Alps. The men are cutting a passage through the rugged ice.

DEEP DOWN IN THE GLACIER'S CREVASSE



Photo: Donald McLeith

The strong, fearless man depicted above is the famous Swiss guide, Andreas Hartman, and he was photographed about 60 ft. down in a crevasse on a glacier in Switzerland. It is by no means uncommon for these crevasses to be 200 ft. in depth. The slightest slip on the part of a mountaineer might result in broken bones, whilst the cold in a crevasse is so intense that an injured person would quickly be frozen to death.

WHERE PERIL LURKS ON EVERY HAND



Photo: E.N.A.

Sometimes crevasses are found too wide to be jumped, as is here shown. To meet such circumstances a light, portable bridge is carried by the mountaineers and used as illustrated in this picture for winning a way across the fissure.



Photo: Donald McLeish.

Peril lurks at every corner in the Alpine heights and one of the dangers is the crossing of a field of fresh snow, newly fallen on an icy surface. Snow in such a position is liable, without the slightest warning, to slide as an avalanche.



Photo: E.N.A.

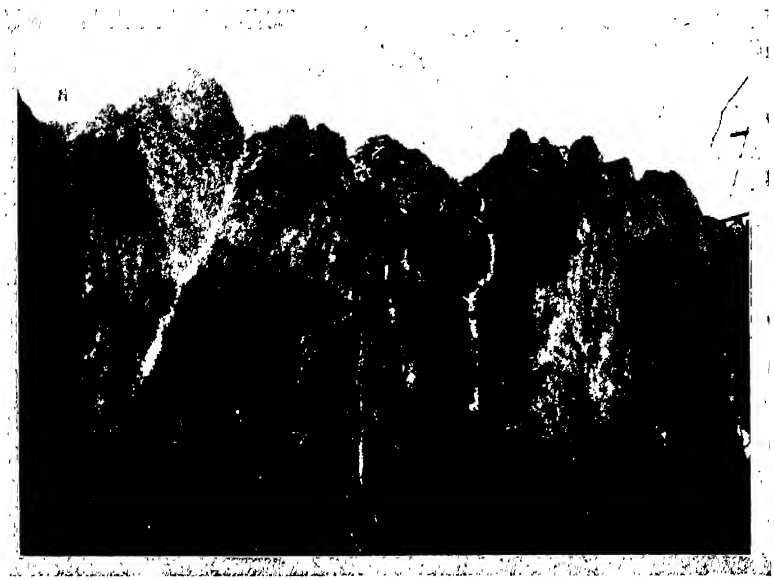
Climbers in the Alps are almost always roped together and sometimes the ropes are fastened to spiked staves known as "alpenstocks" driven into rock crevices. Here we see intrepid rock climbers scaling a rugged pinnacle far above Davos.

at the point where the Sava comes in from the Alps to join the Danube. On its river quays are gaily-dressed sellers of sweetmeats and cakes, and Serbian peasants in their national dress who have come down to see the ships.

The city itself has tall buildings, fine shops, and important-looking hotels and offices, but in the streets the dresses of the country folk and the many different types of people remind us that we are in Eastern Europe, in spite of large numbers of people we see in the drab garb common in the great towns of Western Europe.

Land of the Magyar.

When we leave Belgrade for the next great river stretch to Budapest, we cross Yugo-Slavia into Hungary and begin our long journey through the Hungarian plains, where the Magyar folk live. These great plains are almost treeless, their level expanse reaching to the rim of the world, it seems. Great herds of long-horned cattle and sheep roam over these wide natural grass-lands, where peasants dressed in wide linen trousers, loose shirts, and wonderfully embroidered sleeveless jackets watch their grazing animals from beneath the wide brims of their hats, leaning on their long staffs. In winter they wear thick sheep-skin coats; in summer, on high days and holidays, they fling over their shoulders, like capes, magnificently embroidered overcoats whose sleeves they never use. Here and there in the Hungarian plains are wells from which water for sheep and cattle is drawn by a bucket



Mondiale.

THE TEETH OF WEATHER-SCARRED MOUNTAINS

No actual photograph could give one a greater idea of " Nature in the raw " than does this one, which suggests complete and utter desolation and a scene where man himself would be helpless and impotent. Even the forest trees have difficulty in maintaining life. This wild and barren scene exists among the Bucegi Mountains of Rumania, a country which embraces the rugged uplands of the Transylvanian Alps.

from a great pole slung across a stout upright. The bucket is very heavy, but at the other end of the cross-piece is a weight that enables the water to be raised easily for pouring into the trough.

The Csikos.

On the great Hortobagy plains, where fine horses and cattle are reared, you can see Magyar *csikos* or cowboys who are just as skilful with the lasso as the cowboys of America, and who live their solitary days on horseback.

In the villages of white-walled, heavily thatched houses, richly-adorned head-dresses and costumes are worn on holidays by the women, some of whom wear as many as a dozen skirts at a time, the whole standing out stiffly in a wide circle around their white stockings.

Budapest.

At Budapest, Hungary's fine capital, the beautiful Houses of Parliament rise from their riverside terrace like a magnificent palace; other splendid buildings adorn the opposite side of the river. Buda and Pest are joined by fine bridges. Round the high bluffs of the western bank we glide until we come to the sudden bend that admits us to the Little Hungarian Plain. Floating grain-mills, their huge water-wheels worked by the rushing current that runs here at about five miles an hour, line the riverside; great timber rafts from the far-distant Black Forest, each with its little hut for the raftsmen, come swooping downstream towards us; tugs towing empty oil barges on their way back to Rumania for another load tear by on the flood.

Ahead is Bratislava, the river port



Wide World Photos.

WINSOME MAIDS OF THE VINEYARDS

The sunny natured girls here seen are Rumanians, garbed in their national costume. They are workers in the vineyards, and the season has come round for the gathering-in of the luscious fruit. Rumania does a large trade in grapes and their products, and is also a country of wheat.

AMONG THE PERFUME WORKERS



The women here depicted are Bulgars, wearing the attire of their country. In the leafy glade where we see them they have garnered the petals of fragrant roses, and one can well imagine that a delicious scent is borne upon the breeze from their well-filled baskets The petals are to be used for making that potent perfume attar of roses.



Photos Will F. Taylor

In this illustration we see more of the girls whose summer days are spent among tender rose petals. This portion of the factory is the distillery, in which the precious scent is won drop by drop from the flower particles. From 8,000 tons of roses only 2½ tons of attar can be manufactured. Attar itself has a most unpleasant aroma, and it is used only a single drop at a time for bringing out the fragrance of other scents.

FROM THE STATE OF YUGO-SLAVIA



A highland village in Yugo-Slavia. Here are open-fronted shops with bags of vegetables and grain, and baskets of fruit, beans, onions, paprika and other things for sale. Notice that names on buildings are in the same characters as those used by the Romans. The richest region of Yugo-Slavia is in the north—the basin of the Sava tributary of the Danube.



Photo: Will F. Taylor.

In this illustration we see two Yugo-Slavian women passing the time of day in the neighbourhood of their cottage homesteads, both dressed in their usual workaday costumes. What were formerly Serbia, Montenegro, Dalmatia and other mid-European countries now together form what is known as the State of Yugo-Slavia.

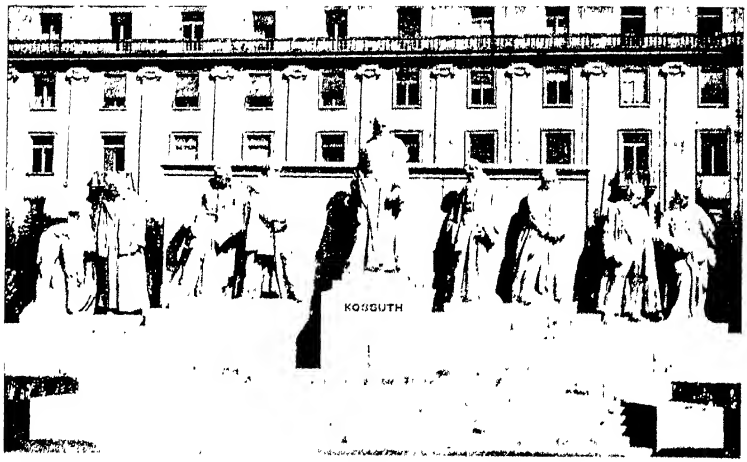
JOINT CITIES OF BUDA AND PEST



Hungarian Film Bureau.

The present capital of Hungary is Budapest, once two distinct cities, but now conjoined. Buda stands on the right bank (looking towards the mouth) of the mighty Danube, with Pest facing it on the other bank. Buda is hilly and Pest flat, and the above view is taken from the height of Gellért-Hegy, which rises above Buda. The suspension bridge in the distance, upwards of 1,200 feet in length, was the work of a British engineer.

BOTH HERO AND EXILE



Here is the magnificent monument to the memory of Louis Kossuth (1802-94), which stands in the city of Budapest. Kossuth is a great national hero in the minds of all Hungarians, for his fiery enthusiasm and strong statesmanship made him the leader of Hungary's bid for independence from Austria in the years 1848-49. Several of Kossuth's later years were spent in exile.



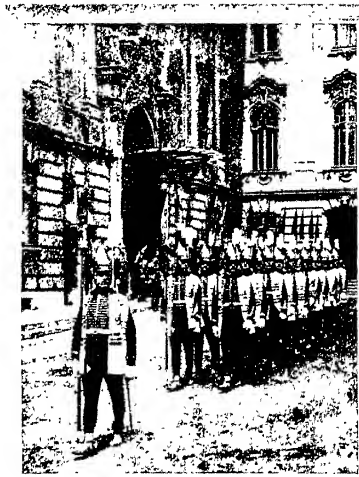
Photos: Hungarian Film Bureau.

In Great Britain we have the honoured tomb of the Unknown Warrior in Westminster Abbey, and the same idea has been carried into effect in many other countries whose forces were engaged in the Great War, 1914–18. Above, for instance, is the singularly impressive grave and monument erected to an Unknown Soldier in the magnificent city of Budapest.

ABOVE THE RUINED CITADEL



This snapshot of a potter working at his primitive wheel was taken in a by-street of Budapest. Ware was made on potters' wheels in Britain before the Romans came.



These men, garbed and armed in the style of the Middle Ages, as are our own Beef-eaters in London, are part of the old Imperial Guard on duty in Budapest



Photos : Hungarian Film Bureau.

Another view of the broad River Danube as it separates the twin cities of Buda and Pest, with the suspension bridge in the middle foreground and Margaret Bridge beyond. The imposing building on the left is the Royal Palace, and the picture was taken from the height of Gellért-Hegy, just above the ruins of the Old Citadel.

MAGYAR PEASANTS AT THEIR WORK



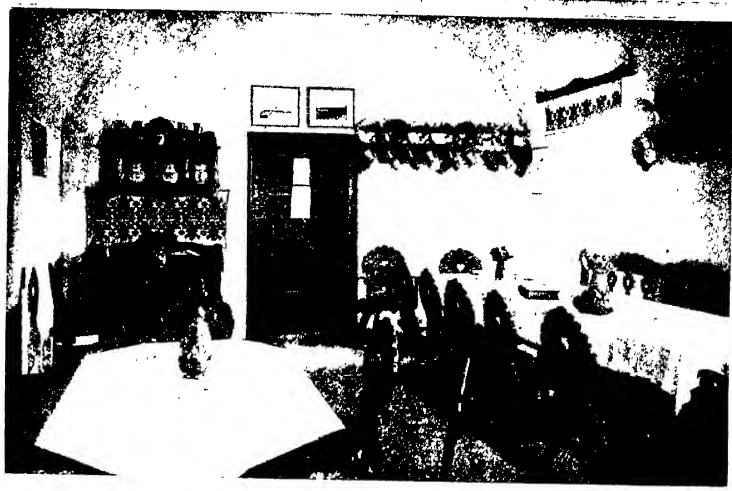
On the almost limitless Hungarian Plain is found a race of agricultural folk who are noted for their excellent, though still primitive, husbandry. Here, for example, work is in progress for cutting the tall stems of reeds for thatching, by means of a machine that looks like a sledge.



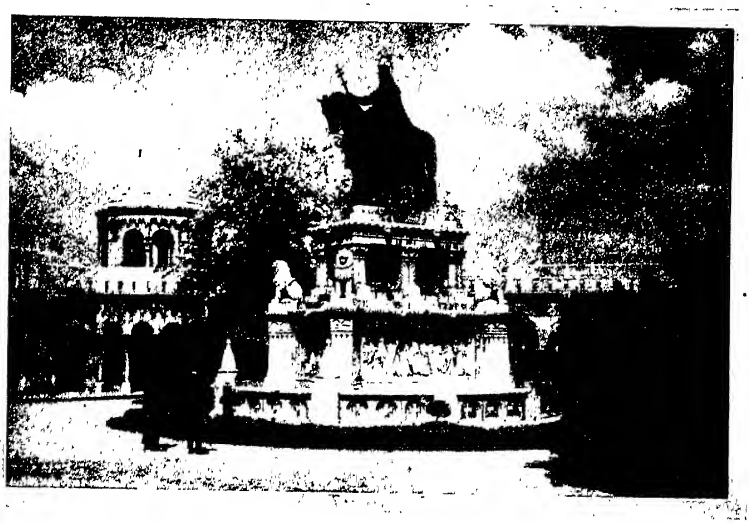
Photos : Hungarian Film Bureau.

A second view of Magyar peasants at their work in the fields. They are harvesting a fine crop of water melons, and we notice the national costume and the gaily coloured skirt of the woman on the right. Among the Magyars we find cowboys as skilful as those of the American prairies.

ST. STEPHEN, KING OF HUNGARY



On the vast Hortobagy plains, famous for their cattle and horses, homesteads are few and far between, for the country is one of great open spaces. The farmhouses are strongly built and furnished in a quiet, orderly simplicity that is very pleasing, as we see above.



Photos : Hungarian Film Bureau.

The elaborately conceived and most impressive statue illustrated looks down upon Castle Hill from one of the eminences of the city of Budapest. The figure is that of St. Stephen, the first King of Hungary. A Royal Order of Knighthood named after St. Stephen was founded in 1761.

PEEPS AT LIFE IN HUNGARY



Will F. Taylor.

It is quite the custom in parts of Hungary for mothers even in these present times to carry their babies on their backs, as is shown.



Mondiale.

In Hungary embroidery is still a striking feature of clothing for men, women and children. The work is done by hand in silk.



Mondiale.

A typical market scene at a small town in Hungary, where the produce of the countryside is displayed to likely buyers. Like most inland countries, Hungary has a very hot summer, as the giant sunshades above would suggest, but the winters are correspondingly cold. Comparatively few Hungarians ever set eyes on the sea, for no part of their country has a coastline.

A SON OF THE PUSZTA



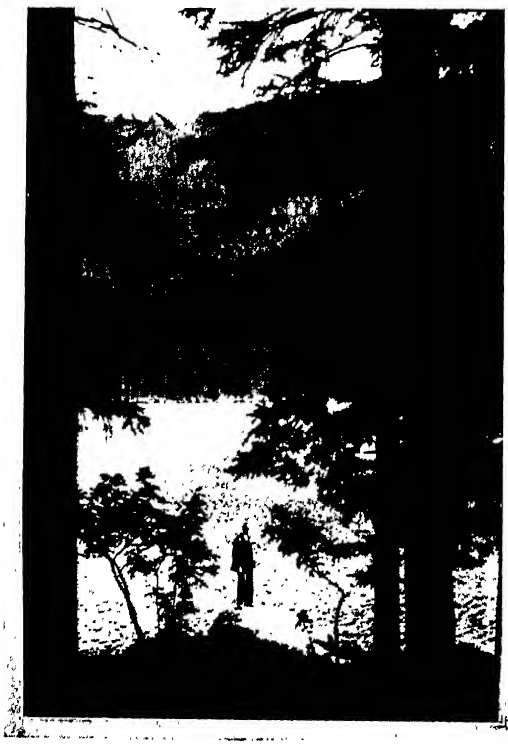
Wide World Photos.

On the rolling Puszta plain or desert of Hungary, akin to the pampas of the Argentine and Canada's windswept prairies, horses and cattle are reared literally by the thousand. There are actual tribes or clans of herdsmen, wonderful riders, who spend long, lonely days in the saddle, and the above is a splendid example of a Hungarian cowboy or "ösiko." The horse is but little less striking than his master.

of Czecho-Slovakia, a country which the Germans over-ran in 1938, adding it to the German Reich. Its great castle on the crag overtopping the town was built to guard it in the old days when the Danube valley resounded with the clash of armies, and when river pirates on the Danube were as common as pickpockets in a London crowd. Even in 1938 Bratislava stood where three frontiers met—those of Czecho-Slovakia, Hungary and Austria. It is a great port for the coal and metals, the glass and sugar of Czecho-Slovakia, the timber and salt of Austria, and the grain, cattle and sheep of the Hungarian plains.

The Austrian Danube.

Shortly after proceeding upstream from Bratislava we are in Austria, now freed from Germany, and on our way to Vienna, its great capital, and much too big for such a tiny country. For not long ago Vienna was the capital of a great rich empire that included most of modern Czecho-Slovakia, all Austria and Hungary, half of modern Rumania and a great slice of what is now Yugo-Slavia, as well as a triangular piece of mountain Italy now called the Trentino.



Will F. Taylor.

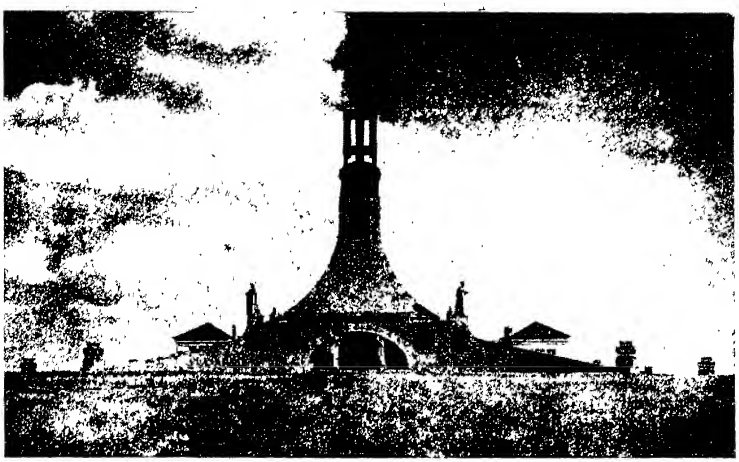
BESIDE A GLACIER LAKE

The lovely spot here depicted is a very favourite one for summer holiday-makers, attracting "hikers," campers and sportsmen from many parts. It is the "Black Lake," the waters formed from the melting tongue of a glacier, and is to be found in the Sumava Forest district of Bohemia. The denseness of the forest on the opposite side of the lake is most striking.

Vienna, like Paris, is the centre of fashion, the home of art and music, and the theatre, and the maker of all kinds of luxury articles; its wonderful parks, its splendid buildings and palaces, all remind us of the days of its splendour when it was the busy heart of the powerful empire that fell to pieces as a result of the Great War of 1914–18.

We are vastly interested in the monster collections of flats, some in great blocks that house more than a thousand people, and built in recent years by the city authorities for families of moderate incomes to live in. In each block working men can live cheaply and comfortably with

WHERE NAPOLEON WAS VICTOR



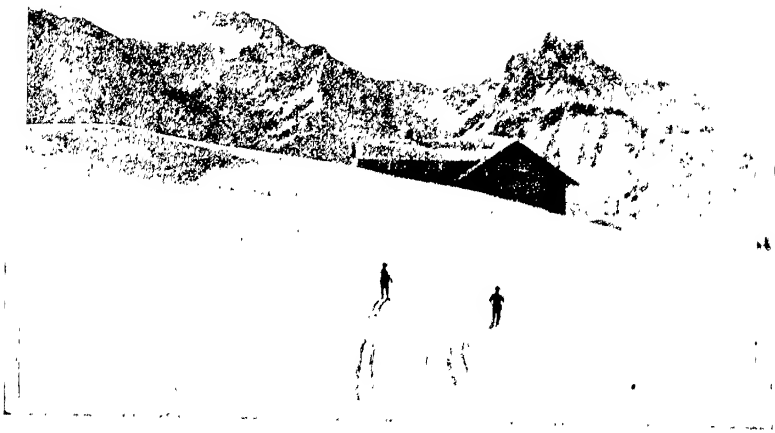
This unique monument stands on Pratec Hill, at Austerlitz, in Czecho-Slovakia, to commemorate the key position in the great battle fought in 1805. The engagement was one of the most notable victories of Napoleon, the French forces opposing a far greater number of Austrians and Russians. Austerlitz is a township from which the battle was named.



Wide World Photos.

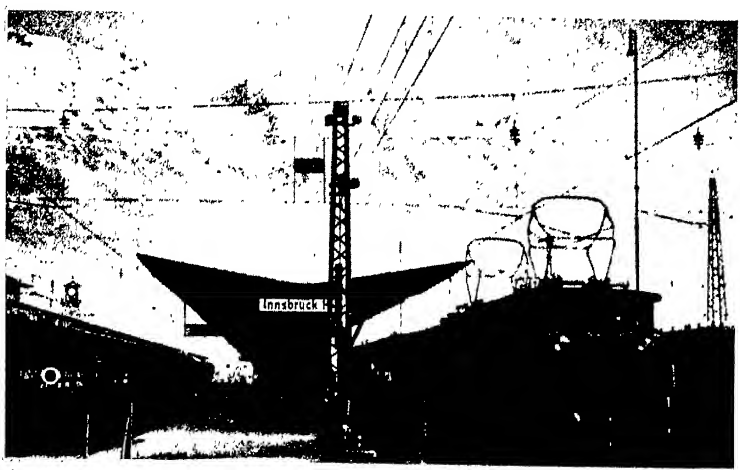
Prague is a Bohemian city and the capital of Czecho-Slovakia. Instead of its ancient monuments and serried rows of houses, this picture shows a view in springtime on the outskirts of the ancient city. The building seen through this sea of fruit blossom is the Church of St. Mary, and the photograph was taken in the grounds of Castle Hradcany.

IN THE TYROL OF AUSTRIA



Austrian Federal Railways.

Should you ever be enjoying a winter tour in the Tyrol, this is the sort of view that would entrance your eyes. To make progress at all you would have to wear skis to prevent you from sinking into the pure, deep snow. The building is a typical mountain hut and the picture was secured near Arlberg. The road through the Arlberg Pass is nearly 6,000 feet above sea level



Mondvale.

The railway station here depicted is that of Innsbruck, a town in the Austrian Tyrol. The place is a noted tourist resort, and from the station countless skiers set off for their health-giving sport among the snowfields. The peak in the background is the famous "Nordkette."

THE WOMAN AT THE WELL



Will F. Taylor.

Upon the widespread Hungarian plains and in many parts of Slovakia wells at the roadside are as plentiful as milestones, providing refreshing drink not only for human beings, but also for cattle and sheep. Though the buckets themselves are heavy, the load is lightened by means of a cross-piece of heavily weighted wood, so that even women can draw water without undue effort.

their families, who can enjoy the advantages of a big central kitchen, a fine playground and a kindergarten for the boys and girls, a central laundry where the family washing can be done, and electric light and heat for all purposes.

From Vienna we go up the river through a gradually narrowing valley until we pass Passau at the gateway from Austria into Bavaria, which, like Austria itself, was for a time a province of the German Reich.

A Wonderful Old Bridge.

Our steamer stops at Regensburg, the highest and westernmost of the Danube's eighteen important river ports —a wonderful old city, many of whose ancient buildings take us right back into the thirteenth century. That old bridge has seen the Danube helping to make history ever since those boats crammed with eager Crusaders floated beneath it on their way to fight the battles of the Cross in distant Palestine. An old legend tells us how Satan would not let the builders finish the bridge until they promised him the souls of the first three living beings who should cross it, and how the master builder foiled the evil one by sending across the newly-completed bridge a dog, a cock and a hen!

If we wish to go farther up the Danube—and it can be followed for many miles yet—we can do so in one of the local 'buses past the tall Gothic spire of Ulm, where navigation of the river begins, and up to the very beginnings of the Danube in the Black Forest, which is one of Germany's favourite haunts in the warm summer days.

But our trip along the Danube has already shown us so many countries, so many peoples, such numbers of entrancing vistas that we may well describe it as one of the greatest international waterways not only of Europe but of the whole world.



Austrian Federal Railways.

WATER FROLICS IN VIENNA

This happy scene represents a bathing-pool for children in the city of Vienna, and we can almost hear the splashing and cries of delight. Vienna is an enormous city and the capital of Austria. It was a centre of fashion and the home of art and music, besides being known the world over for its industries and manufactures. The Empire of which Vienna was the capital was broken up after the war of 1914–18, and Austria became a Republic.



Photokhronika Tass

A FAVOURITE WITH RUSSIAN CHILDREN

M. Sergei Mikhalkov is a famous Soviet writer of stories for girls and boys. He is seen in the centre of this group where there have gathered round him a number of admiring children, all of them pupils at Moscow schools. It is seldom young people can see and talk to their favourite authors.

RUSSIA: U.S.S.R. IN EUROPE AND ASIA

SOVIET RUSSIA covers about one-sixth of the land surface of the globe, for it includes vast territories in Asia as well as those which form Eastern Europe. It extends from the Baltic to the Pacific, on the longest railway in the world Much of the northern part of Russia lies within the Arctic Circle

People of the U.S.S.R.

This enormous land is really a union of sixteen republics, each managing its own affairs by its "soviet" or council, but looking to the great council at Moscow as its leader and supreme authority. For this reason Russia is usually referred to as the U.S.S.R.—the Union of Socialist Soviet Republics.

The people of the U.S.S.R belong to 185 different nationalities, and many languages and dialects are spoken in various corners of the Union.

In the frozen wastes of the far north, by the Asiatic shore of the Arctic Ocean, the primitive Samoyede, Ostiak, Tungus and Chukchi people roam with their reindeer herds, pitching their "choums" or skin tents on the flowering tundra lands during the short summer, and retreating southwards before the early onslaught of winter to their snug wooden villages built at the edge of the great forest of conifers

that stretches in a wide belt from the Pacific to the Atlantic. Some are fisherfolk and hunters, and depend on dogs more than reindeer for hauling their sledges, and upon the creatures of the sea and the shore for their food and clothing.

Many of these curious people worship the spirits of earth and air, fire and water, and obey the wishes of their *shamans;* who, like the witch-doctors of many African tribes, practise rude magic that easily deceives these simple savage folk, who are subjects of the U.S.S.R. just as much as highly-cultured Russians, whose art, literature and scientific discoveries have placed them in the forefront of modern progress. In recent years much has been done to educate these people and settle them in villages. Russian peasants, too, many of whom were uneducated years ago, now have the benefit of State education.



Mondiale.

TOWARDS THE SUMMER PASTURES

Among the peoples of the vast Soviet Union many live in Asia, as does the man seen in this picture with his two young children. The sturdy animal they bestride is a yak, and these creatures are driven considerable distances to summer pastures. The yak belongs to the ox family.

The Great Forests.

South of the northern tundra are the people who live in the great forest belt. In European Russia these are workers who cut timber or labour in the saw-mills, pulp-mills and paper-mills which eat up the lumber as fast as it can be cut; or they are peasants who have made their little farms in forest clearings around their gaily-painted wooden houses, in which the most important thing is the monster stove that keeps the family snug during the long and bitter winters, and is fed by short logs from the great stack piled just outside the door.

In the Siberian or Asiatic part of this great Russian forest, much lumbering is carried on, although it is very difficult to get the timber away to places where it can be sold. Those mighty rivers Ob, Yenesei and Lena—wide and deep though they may be, are of very little use because they flow to the Arctic Ocean and have their mouths sealed by ice for nearly ten months in the year. There is to the south of the forests the great railway known as the T.S.R. (Trans-Siberian Railway), whose steel rails run in an unbroken line from Moscow in Europe to the shores of the Pacific; but carriage of timber all that way by rail is an expensive business. Thus it is that the Siberian forests are as yet scarcely touched by the lumberman's axe, and the dense growth of trees makes it easily possible to lose one's way entirely as soon as one leaves the river or the

forest tracks. The people are few in number. They catch the fur-bearing animals in the forest, and sell their furs to Russian traders who send pelts by boat, by sledge, by road, and later by rail to the great fur markets of Irbit in the Ural country, and of Gorki on the Volga, in the heart of European Russia. Many of these forest people live by the rivers and catch enormous quantities of fish which they store for use during the long, hard winter.



Pacific and Atlantic Photos.

WHERE EAGLES WORK FOR MAN

The bird here depicted is a berkoot, a species of eagle. In a district of Russia between the Caspian and Aral Seas, tribesmen of the Kazacs train these birds to track and kill wolves, foxes and other marauding animals. In this little-known part of the world a well-trained berkoot is worth about £50, for which sum one could purchase ten horses.

The Rich Steppe Farms.

South of the great forest belt lies a rich farming land stretching from the shores of the Black Sea to Western Siberia. Its fertile black earth is particularly suitable for grain, and the Russia we know so much better since she became our ally in the Second World War will soon be one of the world's greatest growers of wheat. Many of the collective holdings in the northern parts of this vast fertile belt go in for dairy farming, especially in Western Siberia, which sends large quantities of butter, eggs and poultry to feed the people of Eastern Europe. As time goes on these farmers will be able to send dairy produce to the markets of Western Europe as they did not so many years ago, but at present the people of the U.S.S.R. in Europe are so much in need of foodstuffs that there is little or none to spare for sale to other countries.

The peasants who live in the European parts of this rich farming land are not all Europeans; some are Asiatic people who came to Russia long ago, and who now have their own soviet republics in the Union. On the banks of the Middle Volga, the great

PREPARING FOR THE WINTER



Planet News.

The iron hand of winter closes very heavily upon most parts of the great Soviet Union and there are not many districts which escape lengthy periods of intense frost and deep, long-lasting snow. Much of Russia is densely wooded and it is for this reason that picturesque timber houses, like the one seen above, are so common except in large cities, where reinforced concrete is freely employed. In this scene the women of the homestead are making their preparations to meet the onslaught of winter by applying moist clay to every joint and crevice in the wood-work so that, aided by the log-burning stove inside the house, Jack Frost can be defied.

THE CATHEDRAL OF ST. BASIL



H. J. Shepstone.

This is an outstanding building of Moscow, the Cathedral of St. Basil, and one of the most picturesque churches in the whole world Internally the Cathedral is divided into eleven separate chapels, and there are no fewer than twelve domes, all of varying form. Colour plays a great part in the ornamentation of the domes, and they exhibit all the shades of the rainbow.



Mondiale.

LIFE IN THE FAR EAST

Samarkand is a town included within the frontiers of the Soviet Union, actually older than Paris or London, and an important centre in a Mohammedan land. Above is a street scene in this picturesque corner of the world, and if you were strolling through the busy bazaar you would hear around you almost all the tongues of Asia.

river that flows right across Russia to the salt Caspian Sea, there is a republic of Germans, the descendants of German colonists who came there many years ago.

Ukraine.

The richest land of all the farming country of European Russia is Ukraine, where wheat and maize, tobacco and fruits, sugar beet and other crops are raised. In Ukraine are many large towns, the finest of which is the ancient city of Kiev, famous for its churches and fine buildings and capital of Ukraine. A great coal-field stretches along the northern shore of the Black Sea, where Kharkov, Rostov, Taganrog and other busy towns make iron and steel goods and have many factories and engineering works. This coal-field is known as the Donetz or Kharkov coal-field.

In Western Siberia farms are very different from the old ones in Ukraine; they belong to Russian peasants who have settled in Siberia much as people from our land have settled in Canada. But where British colonists had to cross thousands of miles of ocean and continent to reach their new home in Canada, these Russian settlers only had the long rail journey from the European parts of Russia.

The Steppe Nomads.

As you go south from the grain-lands and the dairy farms of Western Siberia the land grows drier and drier, and the grass-lands become the steppes on which roaming tribes of herdsmen live in their strange "yurts" or tents, moving from place to place with the seasons in search of pasture for their sheep, horses and camels. The Kirghiz and the Kalmucks are the best known of these nomads. They are very fine horsemen, and live almost entirely on what they get from their flocks and herds. Their "yurts" are of felt faced with leather and bound by long

ropes of horsehair over a beehive-shaped latticework of poles, which meet in a ring at the top forming a hole for the smoke from their small fires. Such dwellings can be set up or taken down by the womenfolk in an hour or so, and packed on the backs of camels or horses ready for the next journey in search of fresh pastures. Many of these people, however, are now settled in villages as farmers, and a family will have its own considerable holding.



A PEASANT OF THE SOUTH *Press Cliche.*

This picturesque figure is that of a typical Tartar peasant, such as you would meet in any part of the Crimea. The Crimea comes to the north of the Black Sea, in which the Danube has its mouths. Further north is the Ukraine, famous for its wheat, maize, sugar-beet and other crops and for collective farms.

The Desert and the Town.

Farther south the Siberian steppes gradually change to the dry desert country of Russian Turkestan, where people are desert men who keep sheep and camels, and wear tall sheepskin hats and thick sheepskin coats, or dwellers in the oasis cities, or in the towns by the rivers that flow down from the high mountains of the heart of Asia. Although the Russians have long ago built railways to link Turkestan with Moscow, the chief way of getting about in this dry land is by camel-caravan or on horseback. The cities — Bokhara, Khiva, Samarkand and Tashkent, for examples—are older than London and Paris; they are vivid with the strange life of the East; in their bazaars are spoken all the languages of Asia, and above their mazes of narrow streets of flat-roofed houses of sun-dried brick, rise the great domes and the slender minarets of many mosques. Yet even here great modern industries have sprung up.

All these peoples—the Samoyedes, and other half-civilised tribes of the north, the Russian colonists of the richer steppes, the strange Buriats of Mongol blood, east of Lake Baikal, the Kirghiz and Kalmuck horsemen, and the Turkomans of the southern desert and the oasis cities—look to Moscow as the head centre of government, for all are members of the U.S.S.R.

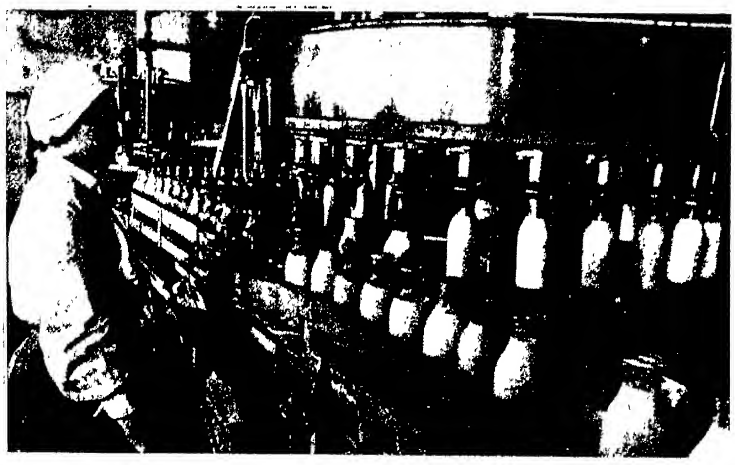
Two Great Cities of U.S.S.R.

Moscow, the capital of all Russia, is



Press Cliche.

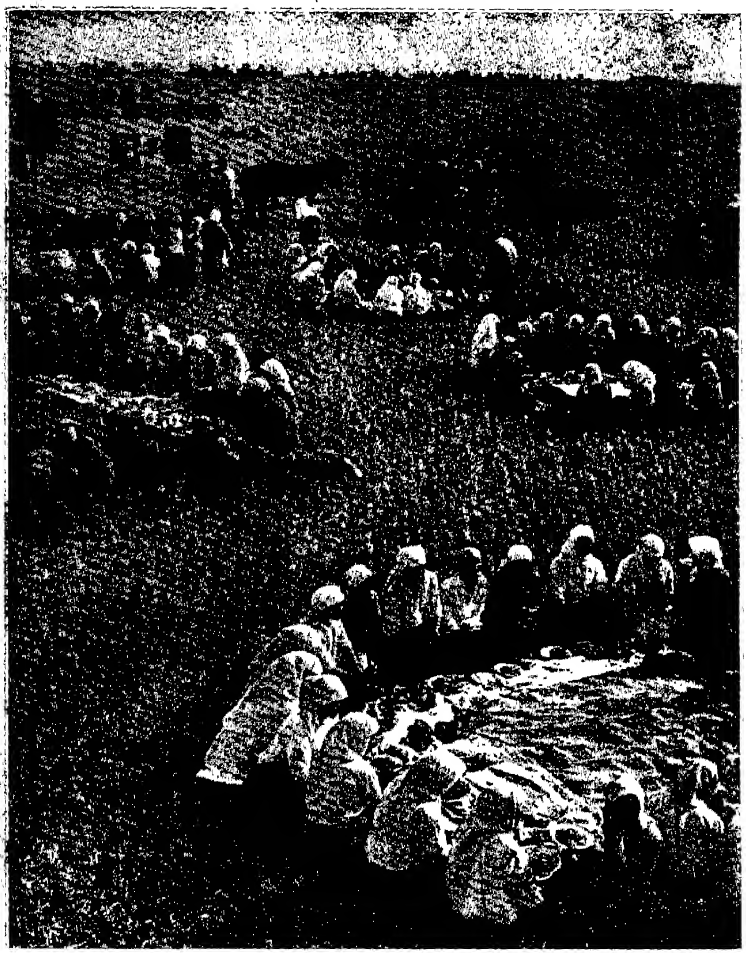
The young men and women seen above are representatives of the Kazaks, a race living on the east of European Russia. They are of Tartar stock and clever agriculturists. Sheep-farming and the growing of wheat and barley form their chief means of support.



Markow.

Thoroughly up to date is the vast city of Moscow and its teeming populace can purchase every modern form of milk product. In this picture we see a corner of the Gorki Dairy where milk is being pasteurised by a process that is entirely automatic. This dairy, one of several in the Soviet capital, can supply a score of distinct commodities all produced from milk.

LUNCH-TIME ON A COLLECTIVE FARM



Copyright.

In parts of the Soviet Union, particularly in the Ukraine, where eight people in every ten are engaged in agriculture, huge collective farms are now the rule. Under this system entire villages will provide the labour for such a farm, tractors, harvest combines and other equipment being supplied by the State, and it is found that by this method the land is made far more productive than when it was cut up into several millions of small-holdings. Everyone helps to till the ground, set the seed and gather in the harvest, and we see in the above photograph groups of workers gathered together for their mid-day meal in an enormous cornfield. No one is forced to work on a collective farm, but those who do share in the profits and take some of the produce. Cultural progress has followed because the government has its scientists always improving seeds, fertilisers, livestock and methods.

CRYSTAL BALLROOM OF THE TSARS



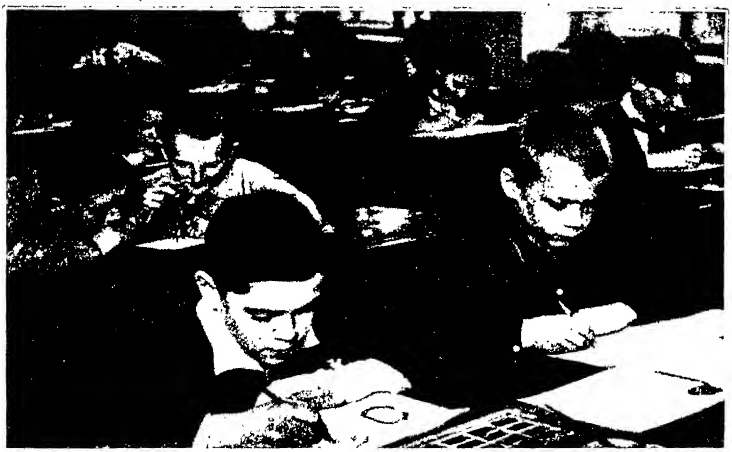
This is the Crystal Ballroom in the Winter Palace of the Tsars in Leningrad, once known as St. Petersburg, then as Petrograd and now named after Lenin, who set on foot the Soviet or Council of the Peoples. The magnificent chandeliers, such a striking feature of the Salon, are cut from pure rock crystal. Under Soviet rule the apartment is preserved in all its former glory and beauty, the Palace being now used as a museum.



Photos: Topical Press.

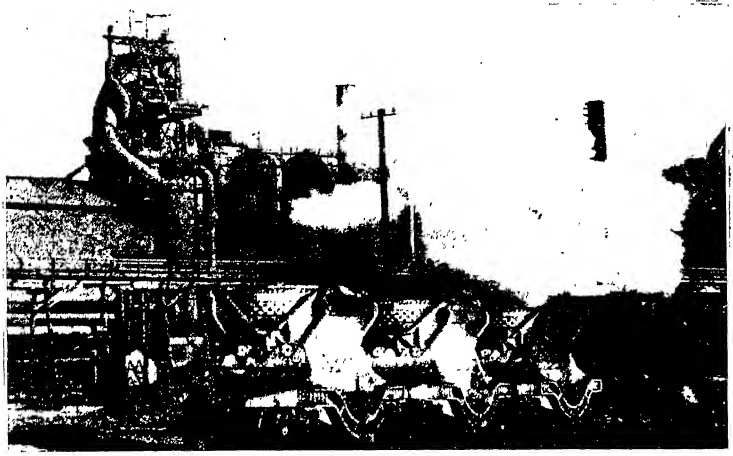
The lovely chamber here illustrated, with its rich plaster-work and noble proportions, was once the banqueting hall of the Tsars at their Livadia Palace, in the Crimea. To-day the Palace has become a home of rest for workers and for the convalescence of those who have been ill. The Soviet Union has many hundreds of sanatoria, rest centres and holiday camps.

GIRLS AND BOYS LEARN DRAWING



Maskova.

Perhaps you have often wondered what Russian children are like, and this photograph of girls and boys at school will give you a splendid idea of their dress and how they appear when busy in a class-room. In this case the camera caught them during an art lesson and their drawing master must have set them a wide variety of work. Thirty years ago half a million people in Moscow could not read or write but there are no illiterates to-day.



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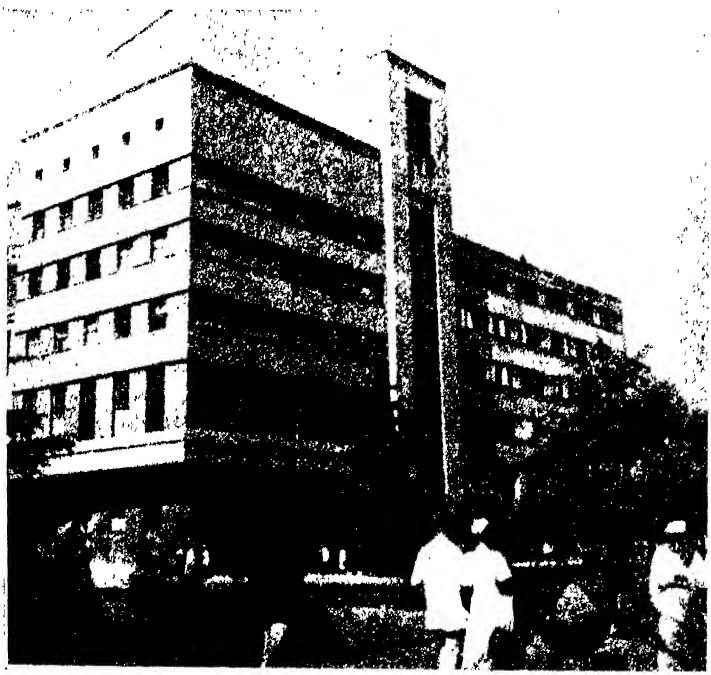
Few countries have in recent years gone ahead more rapidly than the Soviet Union in the development of heavy industries. Above we see a typical modern iron and steel works, which compares with anything in the world for efficiency. Though a steam engine is used for drawing the ladles of metal, electricity has been adapted for the smelting of steel, electrical energy being employed on a vast scale.

a very ancient city standing on the banks of a river of the same name, as it has done since its foundation in the twelfth century or even before that. It is to-day one of the most up-to-date places in the world, drawing its water from the largest European river, the Volga; having direct waterways to the White Sea, the Baltic and the Caspian, and an underground railway with trains running at the fastest speeds and stations finished with glistening marble slabs on the walls. If it owns no actual skyscrapers, it has at least enormous and handsome blocks in which many scores of families can make healthy and comfortable homes.

At the time when the Tsar of Russia ruled, not far short of half a million people in Moscow could neither read nor write. To-day, thanks to all the new schools that have been built and the spread of education's network, there are no illiterates at all.

The Kremlin.

A famous feature of Moscow is the Kremlin, enclosed in its great wall with nineteen green-tiled towers and containing many palaces and churches. Once upon a time it was a mighty



Planet News.

A NEW POST OFFICE BUILDING

As a contrast to the illustration on the opposite page, here is a post office building as recently erected at Tbilisi (formerly Tiflis.) This large town, on the River Kura, is capital of Georgia, one of the Soviet Republics situated between Armenia and the Caucasus Mountains. It is a country of extensive farm interests and has forests and some mineral wealth.

fortress as well as the home of emperors and archbishops, but now we find there most of the offices of the Soviet Government. Here Marshal Joseph Stalin receives distinguished visitors.

Near at hand is the renowned Red Square, the forum of the city and site of Lenin's tomb, where gatherings and parades of national importance are held. What was a maze of ramshackle wooden houses has now become a spacious modern capital with broad streets, noble buildings and every present-day amenity for its 4 millions of virile people.



Copyright.

THE VILLAGE CHURCH

We in Great Britain have countless ancient village churches and the building seen above, erected in 1714, is a little village shrine of Russia. It has no fewer than twenty-two domes and is to be found in the Province of Novgorod.

After Peter the Great.

Leningrad, once known as St. Petersburg, after Peter the Great, and then as Petrograd, was given its present name in honoured memory of Vladimir Ilyich Lenin (1870–1924), founder of the Soviet Union and its first President. From 1713 to 1927 it was Russia's capital and now ranks as the second city.

Leningrad stands on the River Neva, which is spanned by many bridges and broken into channels, though the stream is icebound from November to April. Here we can find a State university, St. Isaac's Cathedral with its gilded dome, and a notable State library. More than 3 millions of people live in this city, which is a vast manufacturing centre with many interests in textiles, shipbuilding, machinery and other industries.

In Modern Russia.

The old Russia of the Tsars came to its end during the Great War of 1914–1918, the very first stone of the modern Soviet Union being laid in 1917. For a quarter of a century after that date much evolution took place and many changes came about so that we find to-day a land area large enough to hold the United States three times over, or England ninety times, with a population of about 193 millions, all looking to Moscow as their capital and to Stalin as their premier and leader. Of this prodigious number more than



Planet News.

AT A CHILDREN'S PIONEER CAMP

A feature of life in the Soviet Union is the establishment of rest centres on the sunny shores of the Crimea where people can go for holidays and for convalescence after illness. At Artek, on the Black Sea, there is a famous camp for those girls and boys who belong to the Young Pioneers, a Russian youth movement, and we see some of the campers above. Children go to Artek from all parts of the Union.

three-quarters make their home on the European side of the Union.

It is therefore no longer strictly correct to speak of Russia, and the name to use for this division of the world, almost as big as a continent, is the U.S.S.R., or Soviet Union. Within this colossal tract of territory we may say that the main resources, such as minerals, foodstuff and raw materials, come under State control and do not belong to private individuals. At the same time, they are all developed for the good of the people.

As one example of how this system functions, let us consider the collective farms which are lent by the State, some of them so large that they may occupy the area of an English county. In the early years of this century there were in the Russian Empire several millions of small farms in the hands of the peasants, most of whom were entirely without education and who did not possess the means for purchasing machinery, or even seeds and livestock of the finest strain.

Thus, the land is now loaned by the State and extensive communal farms have been established to be worked by the peasants with tractors and other expensive equipment supplied by the Government. This means that land can be cultivated much more profitably and the individual peasant is paid for his labour, some of his wages being in the form of produce which he can sell in the open market if he wishes. The State repays itself for the loan of machinery by retaining its share of the crops; and it may be explained, further, that it has its scientists to ensure the best seeds, the finest fertilisers and the most suitable type of livestock.

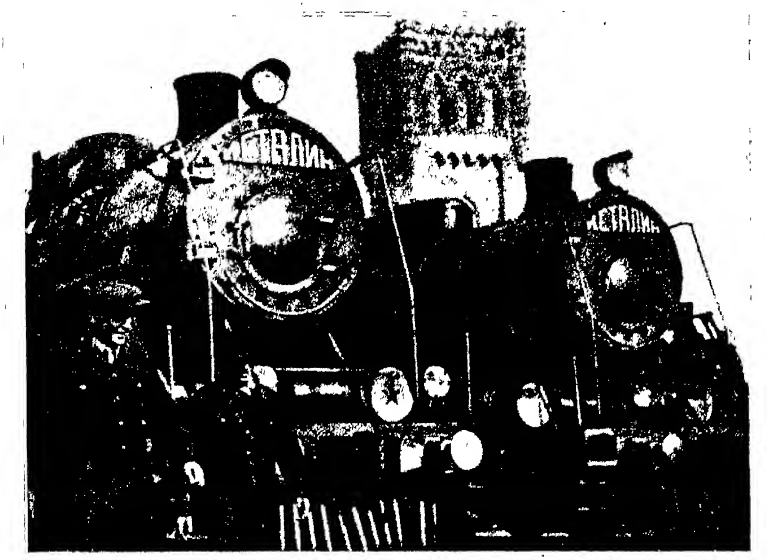
In time of need, as when the harvest is being garnered in, the fields are illuminated by monstrous electric lamps and urgent work can be carried on at night. During the slack time in winter, peasants are encouraged to find occupation in factories in the towns.

Under these new methods enormously increased crops have been won from the land, grain yields being often twice what they were previously, whilst the earnings of the people have been more than doubled and their happiness increased beyond measure.

About the Soviets.

Within the Union there are many different kinds of soviet, a word we can best interpret into English as a council. Every village, town, city, district and region has its own soviet or form of local government, the members of which are publicly elected. In each individual republic there is one supreme soviet which rules according to the needs of its particular country, the requirements of the Asiatic republics being totally different from those of European states.

Above all these soviets comes the Supreme Soviet of the U.S.S.R. sitting at Moscow, and so you will understand the complete chain of law and order from the hamlet to the capital. In any event, all power is vested in the soviets, and whenever it becomes necessary an All-Union Congress of Soviets is held. The right to vote is given at the age of eighteen to young women as well as to young men, and people who live in the backward countries of the Union have precisely the same rights as those who



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RUSSIAN PASSENGER ENGINES

Soviet railways centre mainly on Moscow, and we see above two of the fine express passenger engines as used on the main lines for fast traffic. The great Trans-Siberian Railway, between Moscow and Vladivostok, is upwards of 5,000 miles in length, whilst the Trans-Caspian line to Baku forms another vast through route.

make their home in highly cultured lands.

It is good for us to know what is taking place in other countries, and many of the pillars of the Soviet constitution are of the deepest interest. The right to work is one such pillar, but this does not imply that everyone earns the same wages, for men and women are paid according to their energy and ability. Together with the right to work there is the right to rest and leisure.

Camps in the Crimea.

In this connection, the State provides rest homes, sanatoria, clubs and camps for holidays and convalescence, many of them on the sunny shores of the Crimea, which enjoy a real Mediterranean climate. In one case, at least, a lovely palace which once belonged to the Tsars has been converted into a home of rest for the people.

Under the old rule only about fourteen women in every hundred in the Land of the Tsars could read or write, and a bare eight millions of children attended school at all. To-day there are scarcely any illiterate men and women and considerably over 35 millions of girls and boys are at school, whilst there are nearly a million students in the many colleges. Clever children belonging to poor families are helped to take university courses to fit themselves for the brave new world into which they have been born.

In the Soviet Union, through babyhood and childhood, all girls and boys receive special care from the State. If their mothers are working, places are provided where infants can be looked after in happy surroundings, and when young people first go out to work they have particularly short hours.

At Artek, on the shores of the Black Sea, there is a permanent camp for the Pioneers, a popular youth movement of the country, and here come children from every part. All round the camp is enchanting Crimean scenery with vineyards, magnolias, palms, cliffs and the bright, blue sea. There are dwelling blocks in the grounds, dining-rooms, playing fields and sports centres. In the evenings camp-fire gatherings are held and a stay at Artek is an experience no girl or boy ever forgets. All round this Crimean coast one might find sanatoria for children who are weakly, and forest schools also provide much enjoyment.

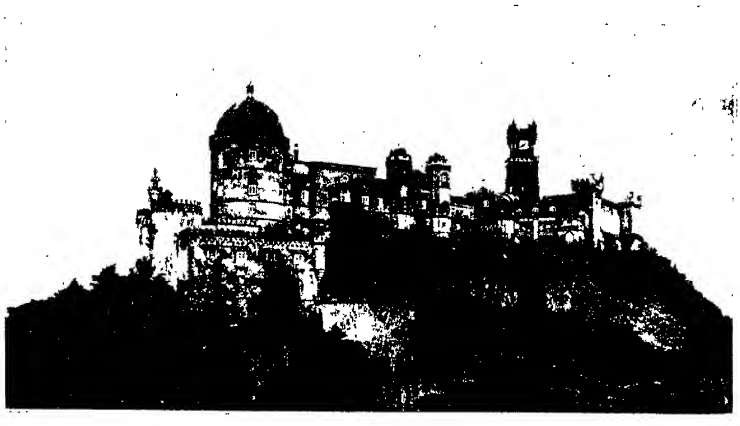
You may not be able to visit Russia, but often one can see Soviet girls and boys on films at our cinemas and you have only to glance at them as they march along or take their part in physical drill to see how favourably they compare with the children of other nations.

The Russian Church.

If ever you travelled in the country of the Soviets you would find many shrines at the wayside, some of them elaborately constructed and others made more simply with wood. The doors are always open so that people may enter for prayer. You would find too, in the villages, just as you do in this country, tiny churches, one of which is illustrated on a previous page, and there are in the cities vast and venerable cathedrals, many of them ornamented with a great wealth of colour that seems strange to our eyes.

We have seen, in the Second World War, the prowess of the Russian soldier and the heroism of the Russian women in the defence of their Fatherland, and we have always before us the epic of Stalingrad, but one of the most striking advances is in the development of the country's resources and industries.

The first twenty-five years of the Soviet system has brought with it immeasurable advances in the outlook and virility of one of the great nations of the world and changed it from a decadent into a thrustful race. What the next quarter of a century holds in store time alone will prove.



Mondiale.

PORTUGAL'S ROYAL PALACE OF PENA

It is no great stretch of the imagination to compare this impressive palace with our own Windsor Castle, for it was formerly the summer residence of the Kings of Portugal. This Palace of Pena stands on a rugged hill at Cintra, rather less than twenty miles from Lisbon, and the country round about is of singular charm. Some of the buildings at Cintra are of Moorish origin.

THROUGH THE BLUE MEDITERRANEAN

DIRECTLY your steamer enters the Strait of Gibraltar and turns eastward into the Mediterranean past the great Rock that has been a British stronghold since 1704, in spite of many efforts on the part of other nations to take it, you feel that you have come to a new world.

For the Mediterranean is very different from all other European seas, and the lands on its shores are different from any other countries of Europe—the trees and plants are different, the people are different, and so are their homes and their ways of living.

The Mediterranean can be very unpleasant on rough, stormy days; but on the fine days which come more often than they do in our seas, it is bright and sunny and its waters are an unbelievable and beautiful blue. The towns along its shores and the people who live in them are bright with colour that seems very strange and wonderful to folks from Britain who see it for the first time. The trees and plants are those of warm Southern Europe. Graceful palms, tall and mournful cypresses, olive groves with their thin grey-green leaves, orange groves of a darker green filled in the autumn with the glowing gold of ripening fruit, and dark forests of evergreen trees all make the shores look very different from those of Western Europe.

This great sea is as long from end to

THE HARVEST OF THE VINEYARD



Portugal is a country famous for its wine, and the peasants have the happiest days in their year when vintage time comes round and they gather in the bountiful harvest of grapes. The snapshot reproduced above was taken in the Province of Estremadura, and we see the vineyard workers loading a consignment of luscious grapes to be drawn by oxen to the press-room.



Photos : E. N. A.

Lisbon is the capital of the Portuguese Republic, busy in the cooler parts of the day, and this picture affords us a glimpse of the River Tagus. The dock is surrounded by a square formed of fine buildings, and is known as the Praca do Commercio, though British residents frequently term it "Black Horse Square," because it contains the statue of King Joseph I. mounted upon a sable charger. On the left of the statue is a triumphal arch of noble proportions.

GRANNIE HEARS THE LESSON



E. N. A.

Here is a very homely scene, affording us a close idea of life in Portugal. The photograph was obtained at Ermezinde, a short distance to the north of the city of Oporto, and it shows us a dear old peasant woman listening closely whilst her grand-daughter recites a lesson she had learned at school. The costume of the little scholar is the one customarily worn in this wonderful country.

end as the North Atlantic is wide. It is very deep, and its waters are very salt.

The long peninsula of Italy, with the triangular island of Sicily at its toe, divides the Mediterranean into two great basins. The shores of Tunis in Africa are not very far from those of Sicily, and commanding the gap between are the Maltese Islands, which belong to the British Empire.

Between Europe and Africa.

Around the western basin of the Mediterranean lie the most important countries; Spain, France and Italy have shorelands there, and so have the French lands in Northern Africa—Tunis, Algeria and the French protectorate of Morocco. The beautiful Balearic Isles are Spanish, Corsica is French, and Sardinia and Sicily, Italian.

The eastern basin has not such important shorelands as the western basin. The Balkan lands of Yugo-Slavia, Greece and European Turkey, of Asiatic Turkey (Asia Minor), Syria and Palestine, and lower Egypt, lie on the shores of this part of the Mediterranean. Just as France has colonies in North Africa on the opposite shores of the Western Mediterranean, so Italy had her North African lands prior to the Second World War. But, on the whole, the lands fringing this eastern basin are drier, less productive and much more thinly populated than those along the shores of the western basin.

There is a great difference, too, between the lands of Southern Europe and those of Northern Africa on the other side of this great sea. The African lands are much drier, and in Algeria you need not travel far to the south by train or motor car before you find yourself in the Sahara, the greatest desert in the world. In what was Italian Tripoli, the desert is nearer the sea, and

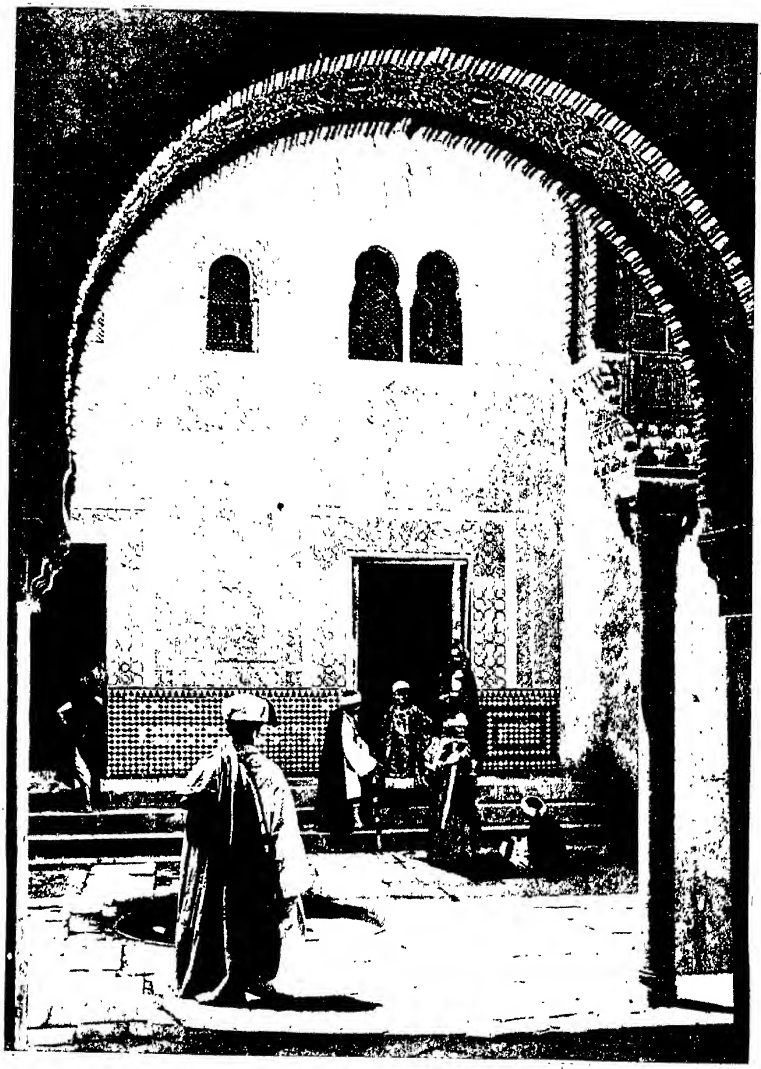


Will F. Taylor.

TAKEN FROM THE FRENCH

Oporto is the second largest city of Portugal and the centre of the port wine trade. In 1809 the Duke of Wellington took Oporto from the French, who six weeks earlier had sacked the town and destroyed over 18,000 men, women and children.

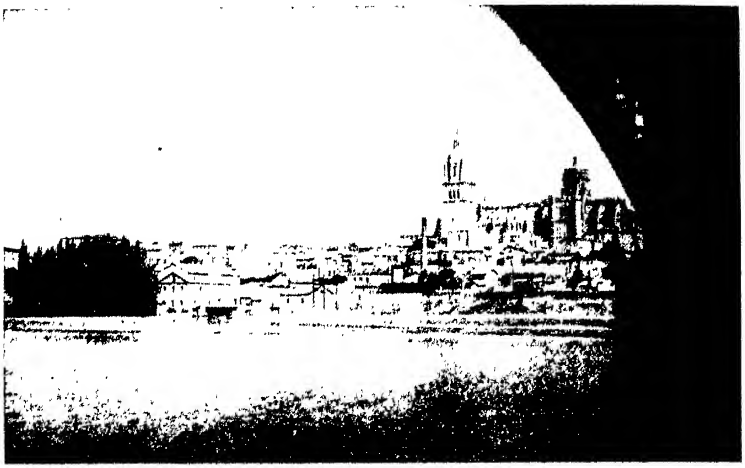
THE FAIRY PALACE OF ALHAMBRA



Will F. Taylor.

One of the chief sights of the Spanish province of Granada is the Alhambra, a marvellous fort and palace built by the Moors and Spaniards and begun upwards of 700 years ago. In this illustration we see the courtyard at the exterior of the Council Chamber, and it presents a strangely Eastern scene in a European country.

ON THE ISLAND OF MAJORCA



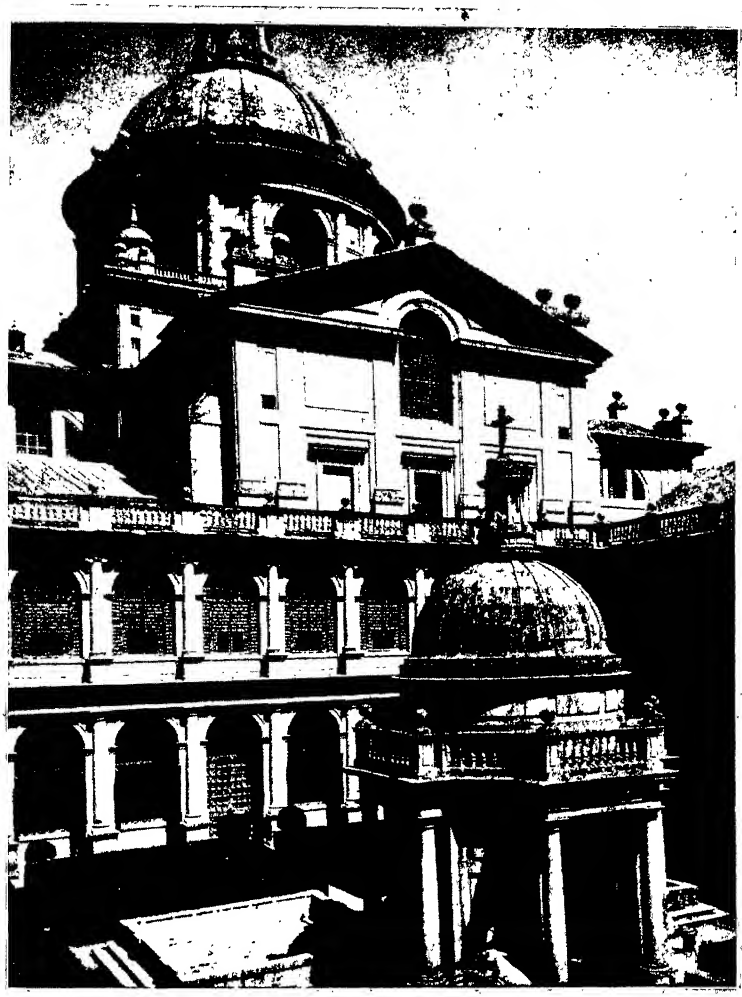
Salamanca, one of the chief cities of Spain, famous for its wonderful buildings, and once one of the greatest centres of learning in Europe. On the right of the picture is the Cathedral, seen across the River Tormes, partly through the arch of a bridge. Salamanca was a place of considerable importance in the times before the coming of Jesus Christ.



Photos : Mondiale.

You will know of the beautiful Balearic Isles, set like gems in the blue waters of the Mediterranean Sea to the east of Spain. Majorca and Minorca form the two largest islands of the group, and the entrancing view shown above is but typical of "Mollorca," as the Spaniards call Majorca. The island is some sixty miles in length and nearly fifty miles across, and possesses a railway and many industries. Majorca belongs to Spain.

THE CHURCH OF THE ESCURIAL



Mondiale.

The Escurial is one of the wonders of Spain, and is not only a palace but a convent and college as well, dating back nearly four centuries. The place forms broadly a huge square, with a tower at each corner. In the centre comes the church, here illustrated, with its enormous dome. Within the building is the Pantheon, where many Spanish kings sleep their last sleep.

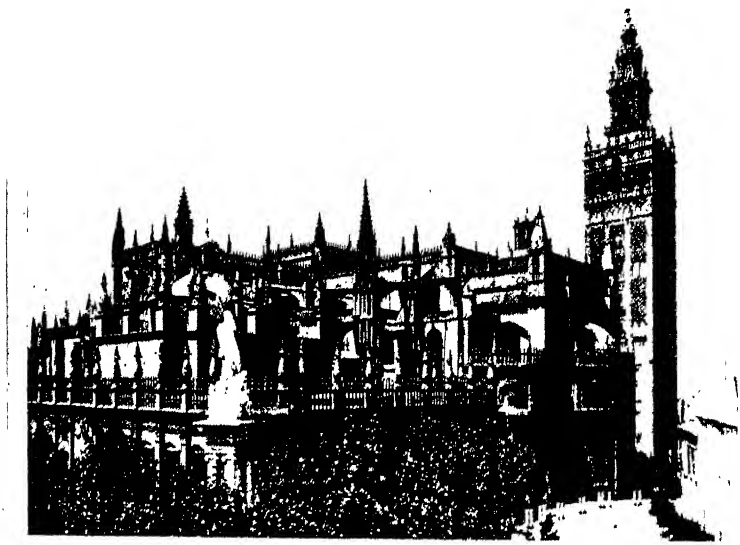
camel caravans come down to its very shores.

The Great Sea of the Ancients.

The Mediterranean was the "Great Sea" around whose shores arose the mighty empires of the ancient world. Egypt, oldest of them all, had her ships upon it; and the Phœnicians, world traders of their day, ploughed its waters with the keels of their merchant vessels and planted their trading colonies around its shores. Greek galleys flashed across its blue in the days when Greece was the greatest country in the world; and Roman triremes and biremes thrashed its waters into foam with their great banks of oars on their way to attack the Carthaginians in their great city port of Carthage.

Along its southern shores the Arabs fought their way in later days, overcoming all resistance and carrying the green banner of their prophet to the shores of the Atlantic, and even across the Strait of Gibraltar into Spain, where the Moors (of Arab blood) ruled for over seven centuries until the fall of Granada, their last stronghold, put an end to their power in the very year in which Columbus sailed from Palos in Spain to find the New World.

All around the shores of the Mediterranean we can still see reminders of its glorious past, which alone make the "Great Sea" still the most wonderful in the world. The pyramids and temples of Egypt, the ruins of Carthage, near Tunis, the Acropolis and the remains of the glorious buildings of ancient Greece, the old Forum at Rome, the Roman amphitheatres and aqueducts of Southern France and Spain, and the beautiful Moorish palace



Mondiale.

THE CATHEDRAL OF OLD SEVILLE

The name Seville reminds us of the oranges so extensively used for the making of marmalade, but the word is taken from the large Spanish province of that name, which has as its capital the ancient city of Seville. Above we see the majestic cathedral of this city, in which much Moorish architecture is featured. The tall structure on the right is the belfry or bell-tower.

A ROCK FORTRESS OF THE SOUTH



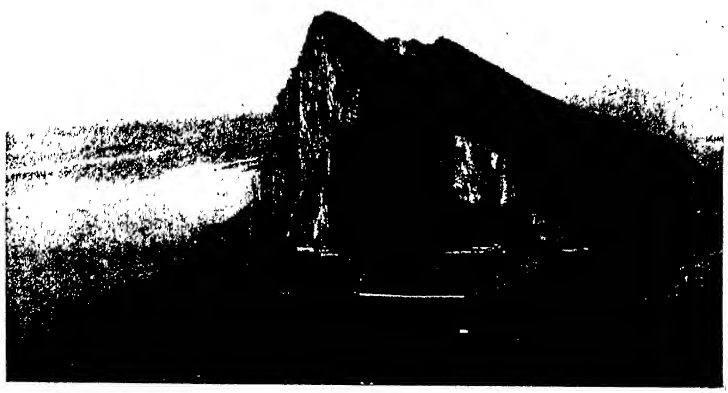
Will F. Taylor.

An aqueduct of Trajan's time at Segovia, and the most important Roman structure in Spain It is some ten miles in length.



Will F. Taylor.

Here are Spanish workers engaged in preparing cork for the market. The best qualities of cork come from Spain.



E. N. A.

The towering fortress of Gibraltar, with a town below, juts out into the Mediterranean and is a most valuable British possession. The photograph reproduced above was taken from an aeroplane. Between British and Spanish territory is a strip of neutral ground upon which no one lives.

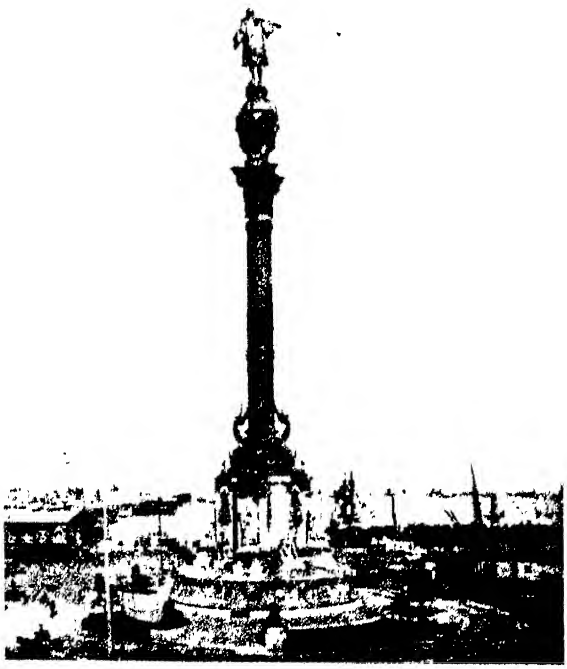
of Alhambra at Granada, all remind us of the rise and fall of the mighty empires of the ancient world, and make a voyage through the Mediterranean a never-to-be-forgotten experience.

The Iberian Peninsula.

Let us peep at each of the countries whose shores are washed by the blue Mediterranean, beginning with Spain and Portugal, or the Iberian peninsula as it is called in the geography books.

The heart of this great square peninsula is an old block of ancient rocks forming the tableland of the Meseta, in the top of which big rivers like the Douro and the Tagus have cut deep gorges on their way to the Atlantic. This Meseta is on the average three or four thousand feet above sea-level, and upon it are mountain ranges still higher, so it is cold up there in winter, and very dry in most parts. The Spanish peasants rear Merino sheep, famous for their fine wool, long-haired goats, and cattle on the pasture-lands. There is one favoured basin on the Meseta, and that is the region around the wonderful old city of Valladolid, where golden grain covers the earth in summer, and ripe fruits hang from trees and vines.

In the very heart of the Meseta is *Madrid*, the Spanish capital, with railways meeting there from all the four corners of Spain. Madrid is very warm in summer, but in winter skating is often possible. Farther south is the ancient city of Toledo, famous in ancient days for its fine sword blades and the skill of its craftsmen in metal.



Will F. Taylor.

COLUMBUS PEERS OUT TO SEA

As Seville gives its name to oranges, so does Barcelona make us think of nuts, and the whole of Spain is famous for its fruit of all kinds. Barcelona ranks as the second city in Spain, and stands on the shores of the Mediterranean. Though Christopher Columbus was of Italian birth, he was much helped in his voyages by Spain, and this fine statue of the navigator stands in Barcelona on a column 200 feet in height.

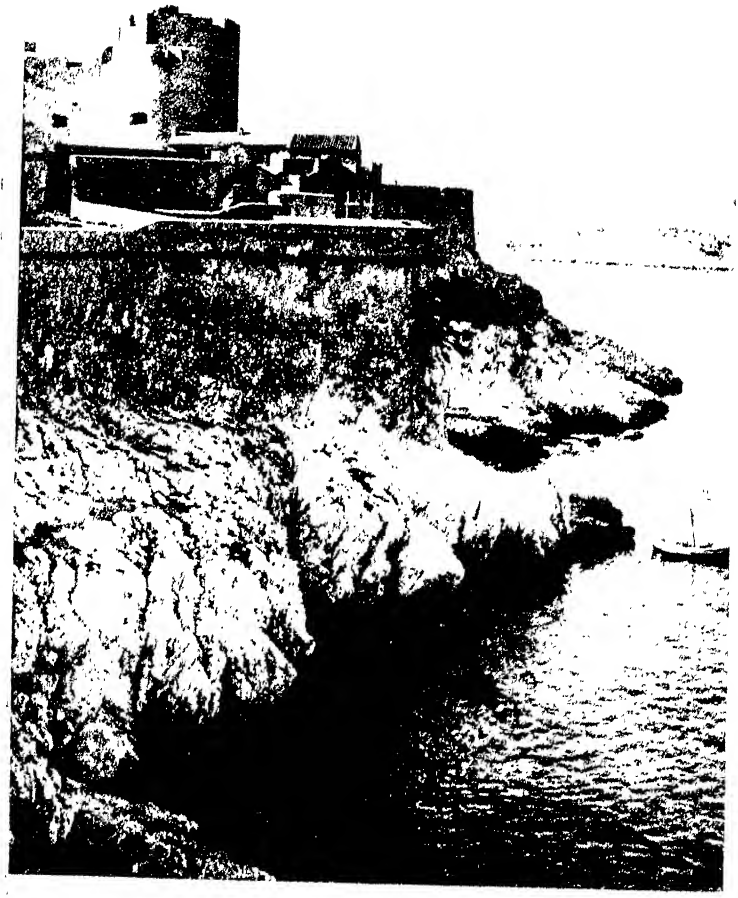
MAKING A PERILOUS PASSAGE



L. E. A.

Our picture shows intrepid rock climbers in the French Alps above Chamonix. At the moment they are merely practising for sterner work on the great mountains, but it needs considerable nerve for any man to cross from pinnacle to pinnacle at this tremendous height.

FACING THE BLUE MEDITERRANEAN



F. N. A.

This ancient fort or castle is known as the Chateau d'If, and stands guard at the entrance to the harbour of Marseilles, in the South of France. The great Mediterranean port was known centuries prior to the time of Christ, for it was first established by hardy mariners from Greece. From its many miles of wharves Marseilles exports wines, fruit and innumerable other products.

The Chateau d'If figures in Dumas' famous story "The Count of Monte Cristo."

A NARROW BYWAY IN MARSEILLES



Mondiale.

We speak of Marseilles as being a great "cosmopolitan" port, meaning that at its docks we can find the ships and sailors of many nations. The above narrow thoroughfare, however, is a byway of the city, where toilers and their families have their homes.

BOTH NICE AND MONTE CARLO



By courtesy of the O. F. T.

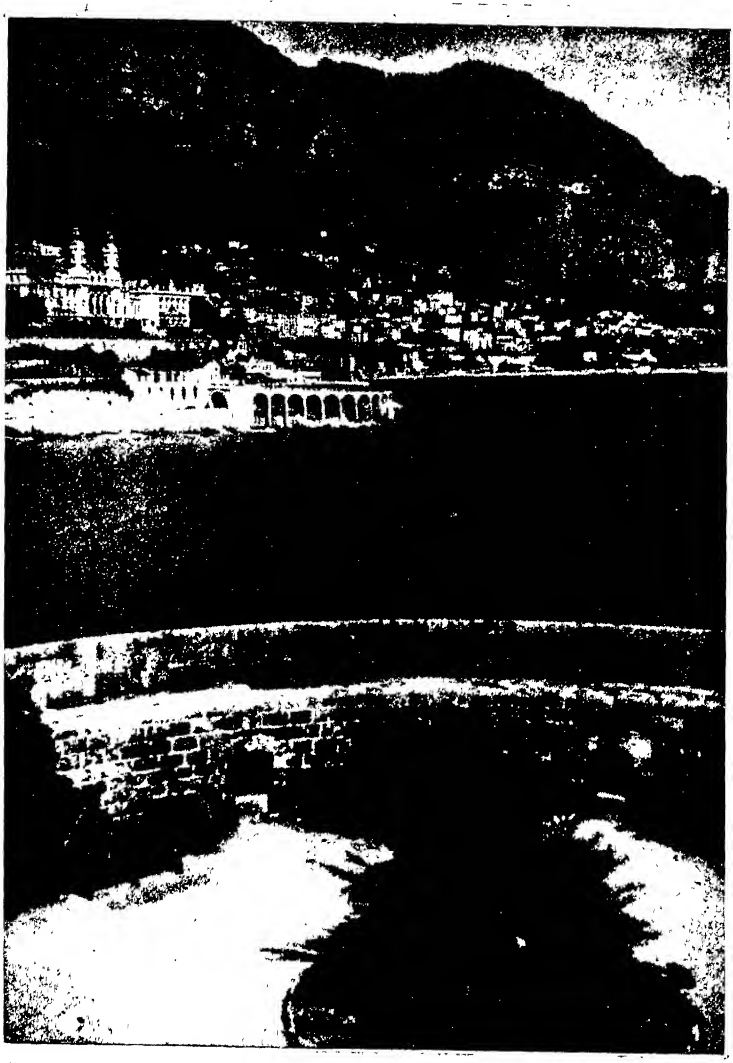
The above picture affords a captivating view in panorama of the city of Nice, which has such a delightful climate and so much of beauty on every hand that it has become a famous winter resort for those able to patronise its countless attractions. The place is protected on the north by the Alps, and is kissed on the south by the Mediterranean. Nice is a French city.



Will F. Taylor.

To many people Monte Carlo is one of the sights of Europe on account of the famous Casino or gambling rooms, though there are beautiful gardens, theatres, and an attractive harbour

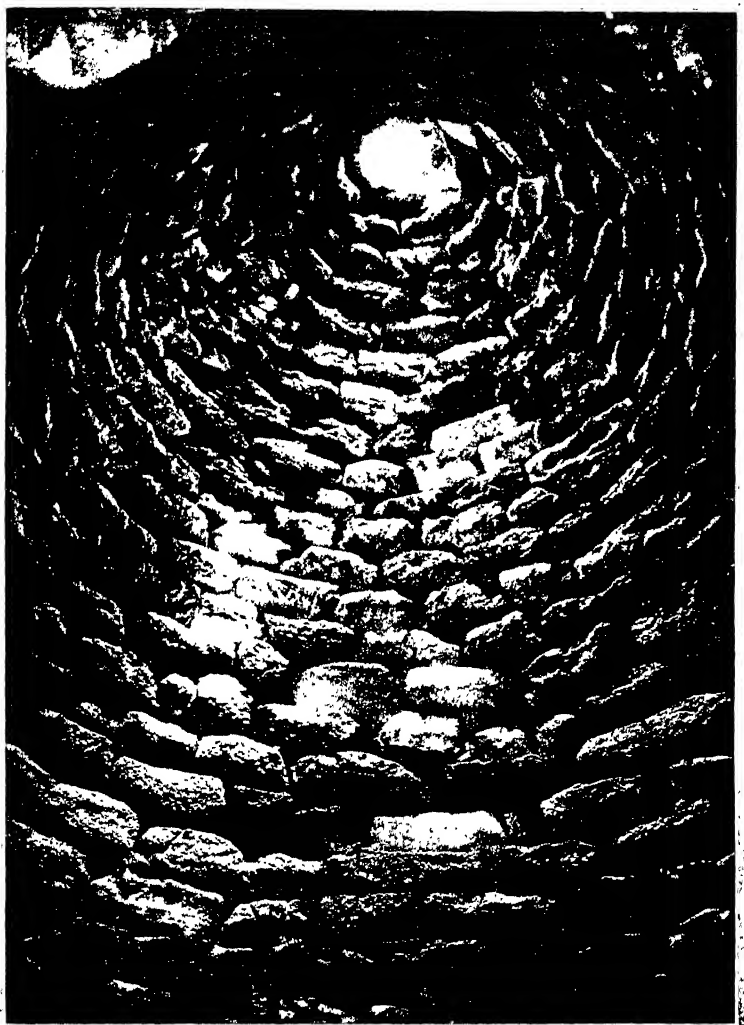
A GEM OF THE SOUTHERN RIVIERA



Will F. Taylor.

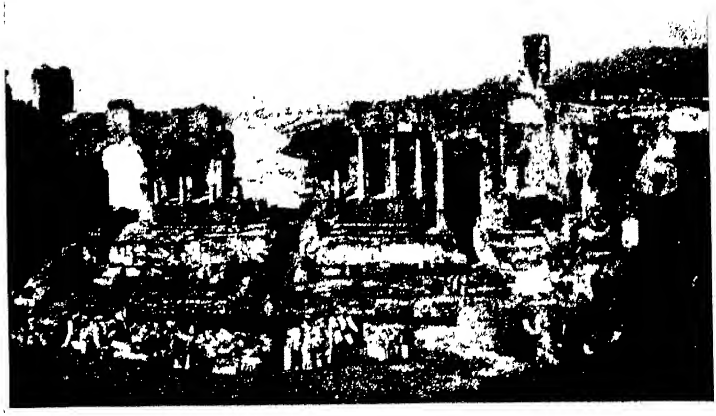
Monaco is a small principality on the shores of the Mediterranean, with French territory to its right and left and behind. The entire State occupies but eight square miles, although it embraces the famous Monte Carlo, with its casino, and the town of Monaco. In the above illustration, taken from Fort Antoine, we are looking eastward towards Monte Carlo.

AN OLD-TIME ROCK-BUILT HOUSE

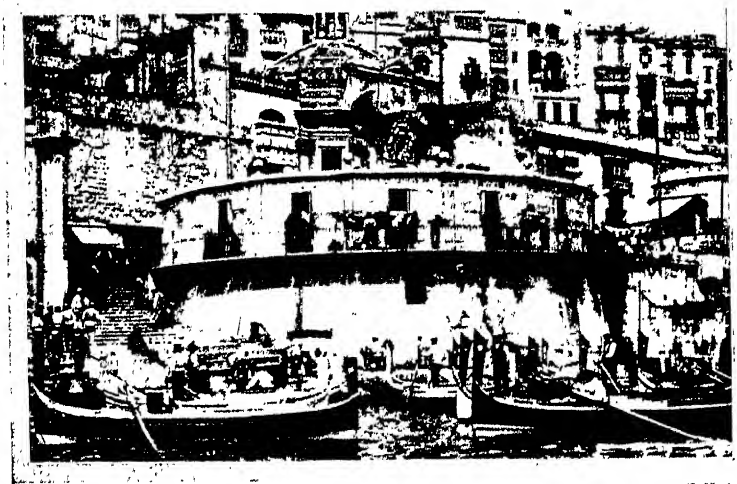


E. N. A.

A glance at your atlas will show you the large Italian island of Sardinia immediately below Corsica. It is a place of great antiquity and contains many relics of the Bronze Age, among them curious stone dwelling-houses known as "nuraghi." These buildings are really cone-shaped towers, and they formed homes for primitive man. The picture shows us the interior of one of these houses, looking upwards. Some of the nuraghi are inhabited to this day.



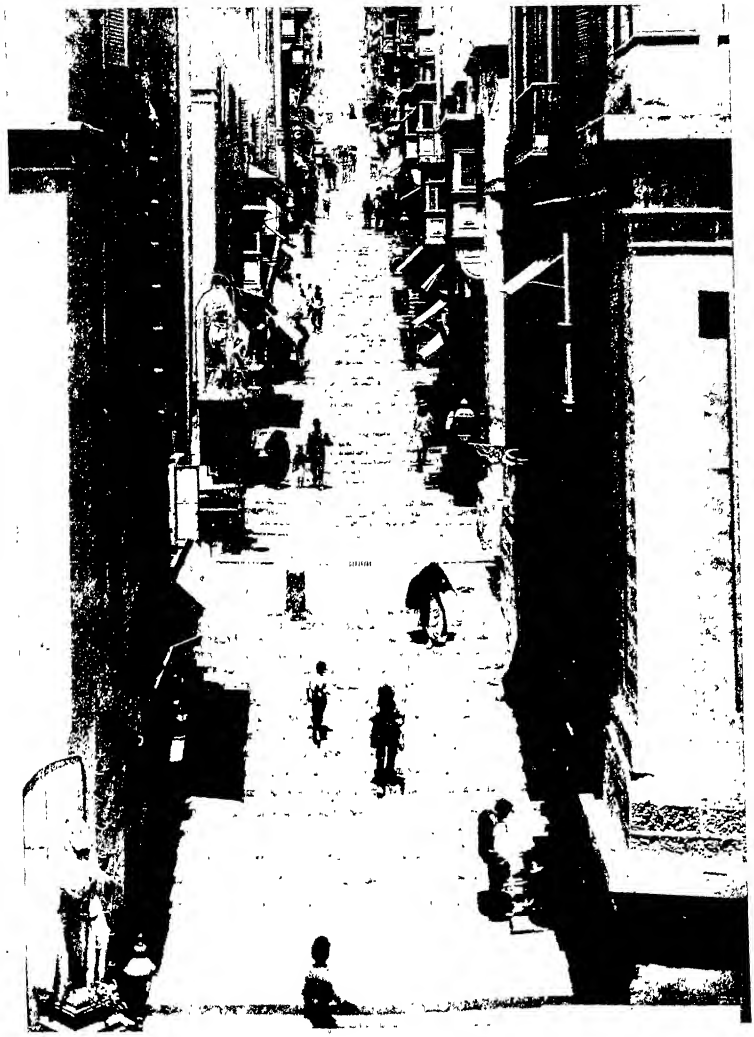
We must visit Sicily, another large Italian island, to see these ruins of an enormous theatre built by the ancient Greeks, and later carefully restored by the Romans. The snow-laden cone in the background is the peak of the great volcano, Mount Etna. There is no island in the Mediterranean of greater area than Sicily.



Photos: E. N. A.

Malta is a British possession immediately to the south of Sicily, and is of the utmost importance as a base of the Royal Navy. The island is about seventeen miles long, and its capital Valetta. The picture above affords us some idea of the extent of this city, and the actual scene upon which we are looking is the Fish Market.

A STREET OF MANY STEPS



E. N. A.

Valetta, capital of Malta, is built upon a steep hillside, and one of its thoroughfares, the Strada Santa Lucia, is illustrated above. So sharply does the ground rise that almost countless steps have to be provided so that people can get up or down to do business at the many shops. For its heroic defence in the World War of 1939-45, Malta was awarded the George Cross by H.M. the King.

A Storehouse of Metal Ores.

Like all old block-mountains in Europe, this Spanish Meseta has rich deposits of metal ores around its rims. The iron ore of the Cantabrian Mountains, in the north, is shipped to Britain from Bilbao and Santander; the iron ore of the Sierra Nevada, the highest range in the peninsula, is shipped from Malaga, which is a Mediterranean port better known for its rich wines, its raisins and its oranges. The well-known copper-mines of Rio Tinto, the lead and silver-mines of Linares, and the quicksilver-mines of Almaden all lie near the southern edges of this old tableland.

The most fertile lands of the Iberian peninsula are the coast-lands, especially the lowlands of Portugal, the rich plain of Andalusia, as famous for its fierce bulls, its pretty girls and its valorous matadors as it is for its wines, its Seville oranges, and its leather of Cordova, and the *huertas* or irrigated lands of the south-east and the east.



L. N. A.

THE GREAT MOSQUE OF ALGIERS

We think of Algeria as a large French country at the extreme north of Africa, the capital being Algiers, a city in which the ways of East and West are strangely blended. Here, for example, is the Rue de la Marine. On the left is a European building, but immediately opposite comes the Djemma Kebir, or Great Mosque, in the architecture of the Moors.

Lisbon and Oporto.

Lisbon, the capital of Portugal, is on the wide deep estuary of the Tagus. Farther north is Oporto, which gives its name to port wine. As you go up to the city by way of the river Douro, you pass its outport of Leixões, where the big steamers call, and make your way between high banks terraced for vines to the very top. Vintage time here is the most exciting season of the year, when sturdy peasants are steeped from brows to feet in the stains of the grape, and there is general rejoicing when the grape-harvest is gathered and the wine presses are running with rich new juice.

The south-eastern part of the peninsula is the driest part of Iberia, yet it is there the finest oranges, the most luscious grapes, the mulberry tree, the sugar-cane, and even rice grow in plenty. This is because great attention is paid to irrigation; the rich red soil is covered

AN ENTRANCE TO TANGIER



E. N. A.

To discover Tangier on the map we look for a narrow strip of territory right in the north-west of the African continent, immediately opposite the Rock of Gibraltar. The place is a busy one, and our picture affords an excellent idea of the sights and scenes you would see on a visit. This particular view shows us the Puerta de la Marina.

with a network of irrigation channels which are jealously guarded by the farmers and fruit-growers.

Spanish Ports.

The ports of Malaga, Almeria, Alicante and Valencia are the fruit-ports which send us heavy cargoes of oranges and lemons, almonds and raisins, pomegranates and grapes for our Christmas tables. At Valencia are big silk-mills, to which the silk from millions of cocoons spun by Spanish silkworms are sent, and from millions of others in Japan, China and Asia Minor, too.

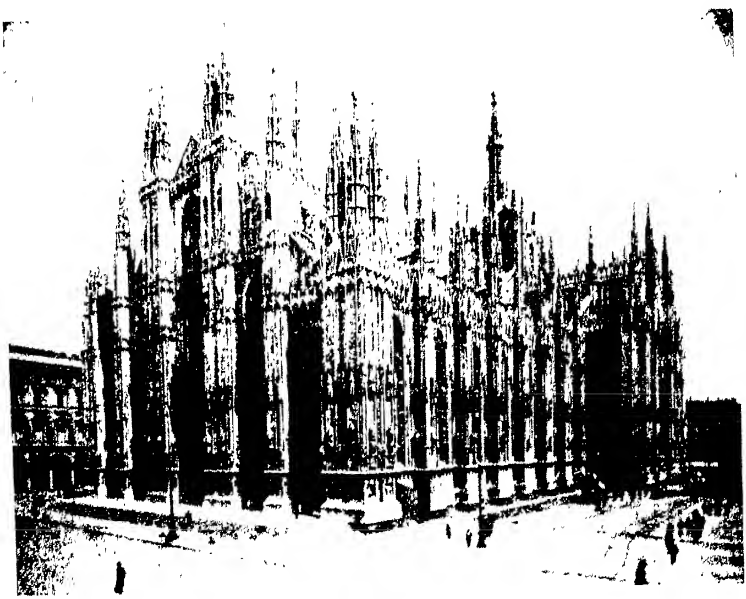
Barcelona is a fine up-to-date port and a manufacturing town, for it has the advantage of electrical power from the rushing streams of the Pyrenees, and rich salt-mines not far away supply the chemical works with some of their raw material.

One of the most interesting cities to visit is Granada, the old capital of the Moors, whose splendid palace Alhambra is on a hill overlooking the red roofs and pleasant gardens of the old town.

The beautiful Balearic Isles, renowned for their lovely flowers and their ancient towns, and for the skill of their potters, are becoming more and more popular every year as winter holiday resorts. The largest is Majorca, with its capital at Palma.

The French Mediterranean.

French Mediterranean lands in Europe

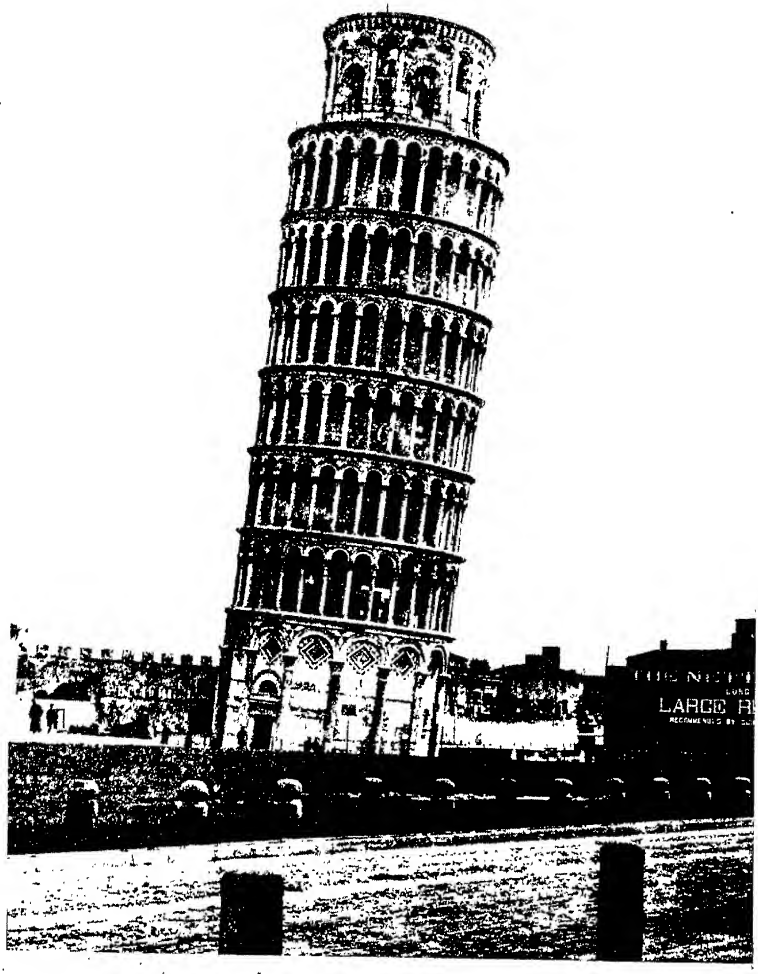


Alinari.

MILAN CATHEDRAL AND ITS MANY PINNACLES

A priceless work of art in stone is the magnificent cathedral in the city of Milan, in Italy. This beautiful building was founded in 1380, but not finally completed until 1815. The roof has over 4,000 marble statues and many pinnacles, and the cathedral itself is capable of accommodating 40,000 persons. Milan is the richest industrial town in Italy, as well as being the chief financial centre.

THE LEANING TOWER OF PISA



Will F. Taylor.

In the city of Pisa, in Italy, there towers upwards a building that is of outstanding interest even in a country possessed of so much that is wonderful in architecture. The Campanile, or Leaning Tower of Pisa, is 179 feet high. Owing, it is thought, to a sinking of the ground on the south side, the tower is now 16¼ feet out of the perpendicular, but yet stands firm.

AT THE CHURCH OF ST. FRANCIS



Siena is an ancient Italian city with many beautiful buildings. Here is an interior view of the Cathedral, fashioned largely in marble of different colours.



Assisi is another Italian town, and the one in which St. Francis was born. The church above forms part of the great Franciscan monastery at that place.



Photos : W. F. Mansell.

We read about St. Francis of Assisi in our section on Great Painters and the work of Giotto and Cimabue. Here we see the crypt in the church at Assisi, where the remains of the Saint were laid to rest. The architecture of the groined and vaulted roof with its rich ornamentation is little short of marvellous.

BY THE SHORES OF LAKE GARDA



Will F. Taylor.

The lovely Lake Garda is situated in the North of Italy, and comes between the provinces of Lombardy and Venezia. The beauty of the coast-line, with its towering background of snow-clad mountains, is almost indescribable. Of the Italian lakes in the region of the Alps, Garda is the largest, being upwards of thirty miles from one end to the other. The water is of enormous depth, reaching to nearly 2,000 feet in places.

are the lower Rhone Valley, the Riviera and the mountainous island of Corsica, at whose capital *Ajaccio*, "the little corporal," who afterwards became Napoleon, Emperor of France, was born. These are lands of the vine and the olive, of oranges and lemons, of wonderful flowers and gorgeous scenery. Both the lower Rhone Valley and the Riviera are favourite haunts of the tourist, the former because of its fine old Roman remains, such as those at Nimes and Arles, and the latter because of its lovely scenery and its mild winter climate that brings to it visitors from all parts of Europe. Nice, Mentone, Monte Carlo and Cannes are only four of the many pleasant places with which this magic strip between the mountains and the sea is studded.

The Riviera extends eastward into Italy to the great seaport of Genoa, where Christopher Columbus was born, and where in ordinary times you will see large ships from all parts of the world.

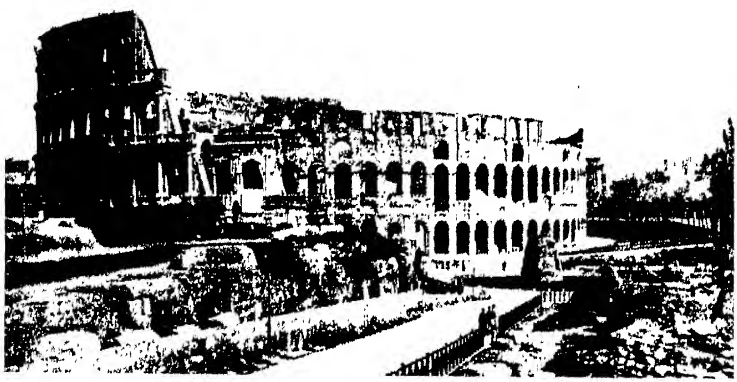
Italy.

Not all of Italy is truly Mediterranean. The rich plain of Lombardy, with its busy cities of Milan and Turin, Verona and Padua, and its island-city of Venice, "Queen of the Adriatic," really belongs to Central Europe so far as its climate is concerned.

Mediterranean Italy is Peninsular Italy, and its shorelands. North of the Lombardy Plain is Alpine Italy, a land of lovely lakes, snowy peaks and deep valleys, and a land of peasant farmers who grow fruits and nuts.

Quarries of Carrara.

The backbone of the long Italian peninsula is the Apennines, on either side of which are broad and fertile plains with many beautiful old cities. The plain of the Arno is part of Tuscany, and the most famous of its towns is Florence, one of the homes of Italian art. In this plain, too, you will find the leaning tower of Pisa, the olive groves of Lucca, and the rich wheat-fields that supply the Leghorn strawplait, which was once famous all over the civilised world. Among the hills by the sea to the north are the great quarries of Carrara, where the finest marble is obtained.



Will F. Taylor.

WHERE THE GLADIATORS BATTLED

The Colosseum at Rome, where gladiators fought, and Christian martyrs were given to the lions, is now a ruin, though one of the most impressive ruins in the world. We can guess how vast this theatre was when we learn that it could hold some 45,000 people.

ALONG THE APPIAN WAY



You will have heard of the Appian Way, a great trunk road built by Appius Claudius some 300 years before the time of Christ. It was the chief highway from Rome to the East, and extended to Brindisi, on the "heel" of Italy. Our picture shows a view of the Appian Way in the neighbourhood of Rome to-day, with some of the ruins which extend for miles on either side.



Photos : W. F. Mansell.

The Arch of Constantine, adjacent to the ruins of the Colosseum in Rome, is one of the most magnificent remains of the Roman Empire, and a fitting memorial to that great Emperor. We should note in particular the finely sculptured figures, the size of which we can guess by a comparison with the height of the human beings below.

OUTSIDE THE PANTHEON AT ROME



W. F. Mansell.

The picture above gives us a view of one of Rome's most wonderful buildings, the Pantheon of Agrippa. The word "pantheon" means a temple for all the gods, and the structure here illustrated is perfectly circular, the entrance being supported by massive columns.



Anderson.

In this illustration we see the ruins of the Forum of Augustus at Rome, with the remains of a temple in the background. The term "forum" was in the days of ancient Rome applied to a market-place, or centre, where different kinds of business were transacted. In connection with a forum there was usually a court of justice.

RUINS OF THE "ETERNAL CITY"



Alinari.

The main Forum of ancient Rome is now but an assembly of majestic ruins, but in olden times this spot and the buildings centred round it constituted the very heart of the great city. Here we see the remnants of what was once a mighty temple, our view obtained through a beautiful arch which has well withstood the passing of time.



ON THE GULF OF SALERNO *Alinari.*

If you locate Naples on your map of Italy you will see that the city stands on a bay and that immediately to the south the coast-line bends inwards again to form the Gulf of Salerno. Here you will see marked the city of Amalfi, depicted above, with its wonderful scenery. Our picture was taken from the shady cloisters of the famous convent of Capuchin.

Rome and its ruined Forum.

Rome sits upon her seven hills with a marshy plain between them and the sea. All who are lucky enough to go there visit the ruins of the old Forum, where the mighty Emperors of ancient days showed themselves to the Roman crowd, and where famous orators and senators, poets and musicians, patricians and plebeians thronged when Rome ruled the world, and the Colosseum where gladiators fought in the arena.

In Rome, too, are the papal palace of the Vatican and the great Cathedral of Saint Peter, which remind all who come that this city is the home of the head of the Roman Catholic Church throughout the world.

Beautiful Naples.

Farther south is the plain of Naples,



Alinari.

A CITY CONSTRUCTED IN THE SEA

Venice is one of the most fascinating cities in Europe, for it has many waterways instead of streets, and much of its traffic is conducted by means of one-cared boats known as gondolas. Above is a picture of the Grand Canal at Venice and you will notice both the gondoliers and mooring posts for their craft. Some of the mooring posts are illuminated at night with lanterns. The domes are those of the church of Santa Maria della Salute erected three centuries ago.

and one of the world's most beautiful cities on its lovely bay, with the volcano of Vesuvius as a strange and wonderful background behind a rich and fertile land of orange and lemon groves, vineyards and flowers. This is the land of macaroni, made from the paste of fine wheat grown in the plain of Naples, or in that of Apulia on the other side of the Apennines. You can see miles of macaroni drying on frames in the yards of Naples, Amalfi and other towns in the neighbourhood.

No one can visit Naples without being tempted to do two things: first, to ascend by the mountain railway to a point high on Vesuvius to go on to view its panting cone in the midst of

CLIMBING IN THE DOLOMITES



L. E. A.

If you closely examine this picture you will see a tiny figure descending the Campanile Rosa, a peak in the Dolomites. The climber is a woman, Signorina Zardini, and higher up near the summit is her companion to whom she is linked for safety by a double rope. The Dolomites are in the Alps of the Trentino, and are noted for their jagged peaks.

NATURE BUILDS AN ARCH



L. E. A.

High up in the Dolomites, nearly 11,000 feet above sea level, the photographer took this snapshot through a perfect arch of snow. Alpine scenery makes a particularly delightful picture when the frame has been fashioned by Nature's hand, a frame composed of glittering snow melting in the noonday sun.

FROM ALBANIA, THE MOUNTAIN STATE



Albania was incorporated in Italy, 1939. It has a coast-line to the Adriatic Sea, bounded by Montenegro, Serbia and Greece. The small country is very mountainous, and its people seem far behind the times when judged by the standards of other nations. In this picture is a study of a fruit merchant's stall in one of the townships.



Monarch.

Here we have a group of the hardy mountain folk from the northern part of Albania, and it would appear from the weapons the men carry that they are of a most warlike nature. Yet they are childishly curious and inquisitive, and men, women and children will gather round to quiz a peaceful stranger. Albania is a Balkan country.

PICTURES FROM MODERN GREECE



Wide World Photos.

Greece to-day is very different from the Ancient Greece of the classics. Here we see a hawker of lemonade, whom we might meet in an Athens street.



Wide World Photos.

This little maid, tending the sheep and wearing her elaborate national costume, hails from Macedonia, a country partly in Greece.



Will F. Taylor

In this picture we have a typical Grecian shepherd boy of our own time, seemingly very raggedly clad, but with a crook to help him with the sheep. Greece itself is a rugged, mountainous country, and many of the peasants still wear kilts. Currants form one of the chief crops of the more cultivated districts.

BEFORE THE STORM BREAKS



Mondiale.

The country of Greece has a very extensive seaboard, and its coasts are lapped both by the Ægean and the Ionian Seas. For this reason it has many ports, for a great coastwise trade is carried on, and here we see the harbour of Nauplia just before the storm, which is brewing in the distant mountains, breaks. Naupha stands on a gulf of the same name.



Will F. Taylor.

In this picture we have a group of typical Greek peasants, and can see the type of small cottage in which they make their homes. The figures on the left in the dress to which we are accustomed make a marked contrast to the kilted men on the right. A great deal of the open country of Greece is too rocky and barren of soil to be profitably farmed.

NEW YEAR'S DAY IN ATHENS



Wide World Photos.

Greece is a country in which saints' days and all such festivals are strictly honoured, and New Year's Day comes in for special attention. On this occasion stalls are erected even in the principal thoroughfares, at which people purchase New Year's gifts, and our photograph shows the jostling throng in Eolos Street, Athens, on the first day of January. The building on the right, which appears to be temporarily closed, is the National Bank of Greece.

THE SHEPHERD AND HIS SHEEP



Martin Munkacsy.

On the high plateau or tableland of Anatolia, as Turkey in Asia Minor is called, vast flocks of sheep are raised, mainly for their wool, for usually it is only the flesh of lambs that is eaten. The animals are of the Asiatic type, with long horns, and here is a representative Anatolian shepherd surrounded by his long-woolled charges.

MENDING HIS BROKEN ROSARY



Martin Munkacsy.

In this beautiful camera study we have a " close-up " picture of an old Turkish man who is repairing the string of his broken rosary so that the beads may not be lost. The snapshot was obtained in Stamboul, which forms a part of the city of Istanbul, formerly Constantinople. The streets of Stamboul, once narrow and ill-kept, are undergoing great changes for the better.

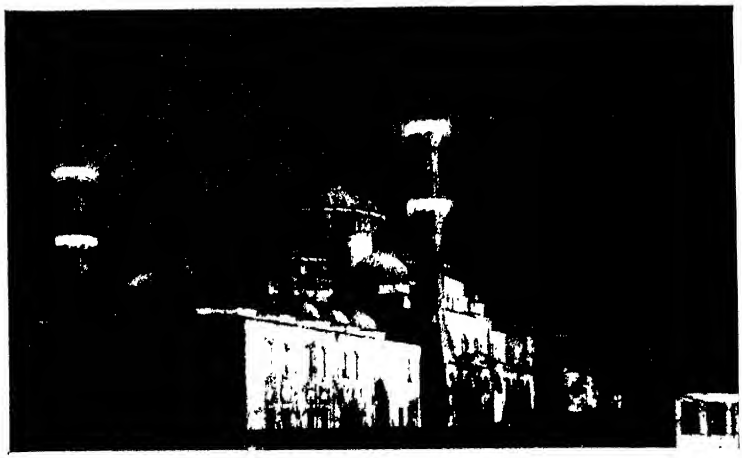
MENDING HIS BROKEN ROSARY



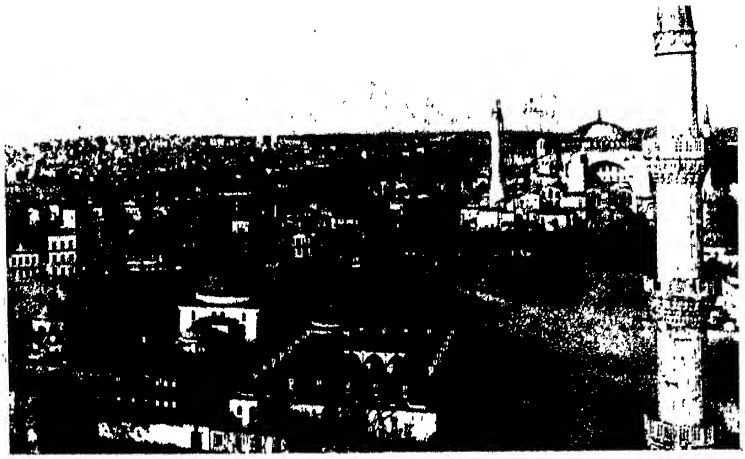
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TURKEY'S ANCIENT CAPITAL—



One of the great festivals in the year for Mussulmans is the Fête of Ramazan, which lasts for thirty days, the actual celebrations being always held after midnight. Above we see the Mosque de Fatih at Stamboul during the progress of one of these festivals. Ramazan, known also as Ramadan in certain countries, is the month in which the Koran was revealed to the Prophet.



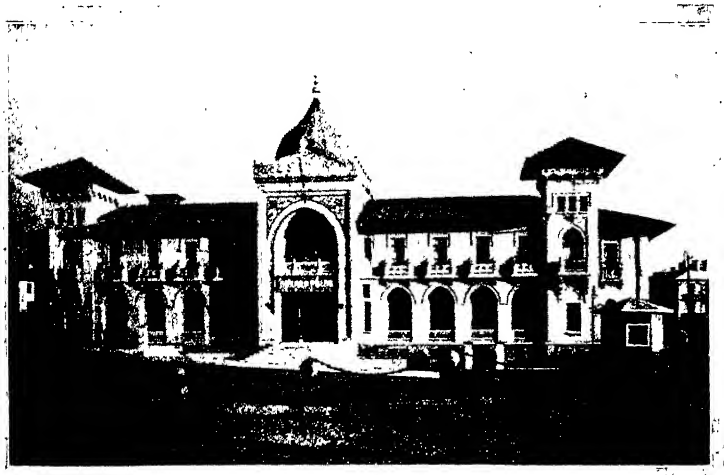
Photos: Wide World.

Istanbul, the old-time capital of Turkey, consists of four main parts—Stamboul, Scutari, Galata and Pera—and we have in the above picture a view of Pera, as seen from the minarets or towers of the Ahmed Mosque. In this particular district we should find the principal shops, and it is here that European residents or visitors are most likely to stay.

AND HER MODERN CHIEF CITY



The present-day capital of Turkey is Angora, spelt Ankara by the Turks. The place is historically very old, for it was once a Roman town, but it is now being laid out and reconstructed as a thoroughly modern city, as the above picture shows, though the work was only commenced in 1922. The statue is that of the late Kemal Ataturk, who inspired modern Turkey.



Photos : Wide World.

It seems strange that a place which was once a town of the Ancient Romans should become a modern capital, but enormous progress is being made by the Turks with Angora in Anatolia Here, for instance, is the Angora Palace, the name on the portico being written " Ankara Palas." Angora is the chief centre in the mohair industry, this material coming from the wool of goats.

THE TURKS AT HOME



The picturesque Turkish boys here depicted are boot-cleaners, with the implements of their calling. They were snapshotted at Stamboul, a district of Istanbul.



You will be wondering what a Turkish home is like, and this picture gives you a splendid idea. You would not, however, be allowed to cross the threshold.



Photos : Martin Munkacsy.

Bathrooms and wash-basins form no part in old-fashioned Turkish homes, and we see above the public place outside a mosque to which men go to perform their ablutions. This photograph was taken in the old part of Angora. More up-to-date ideas now prevail as this great modern capital is being developed along present-day lines.

its old crater; and second, to see the once buried cities of Pompeii and Herculaneum, which were overwhelmed in the great Vesuvian eruption of A.D. 79, and whose uncovered remains enable us to form a very good idea of what life must have been like in a large and prosperous Roman city over eighteen hundred years ago.

Among the Apennine valleys live peasant farmers who gather chestnuts to eat as we do vegetables, or to make fine flour, and who grow olives and terrace the hillsides for gardens and vineyards. Many still use the one-handled old wooden ploughs, and gather their small harvests of maize and wheat by hand. On the drier slopes sheep and goats are reared to provide milk and meat.

Towns of the Hilltop.

There are many wonderful old hilltop towns in Southern Italy. One of the best known is Orvieto, perched on a volcanic rock overlooking a fertile valley, and crowned with an ancient castle and a beautiful old Gothic cathedral.

The Island of Lemons.

Sicily, "the island of lemons," is dominated at early morn by the huge triangular shadow of Etna, its giant volcano, which rears its mighty nest of cones nearly 11,000 feet above the blue waters of the Mediterranean. Messina, its port on the straits, Palermo, its capital, and the old ruins at Taormina and Syracuse remind us of its ancient glories when the Greeks made their homes there, and of later days when Rome was the ruler of the world.

The eastern lands of the Mediterranean have their beauty, too, as well as their reminders of a glorious past. There are Zara and Ragusa on the eastern shore of the Adriatic; there are the wonderful ruined temples and palaces of Greece and Crete; and at the gate of the Bosporus there is Istanbul on the Golden Horn, with buildings that tell of the might of ancient Rome and the rule of the Turk.



THE WALLS OF THEODOSIUS *Will F. Taylor.*

More than 1,500 years ago Theodosius II. erected a long line of fortifications to strengthen the defences of the city of Constantinople, now called Istanbul. The ruins of a portion of these battlemented walls are seen above. In Roman days Constantinople was known by the name of Byzantium.



American Colony, Jerusalem.

"WHILST SHEPHERDS WATCHED . . ."

The above modern photograph was taken in Palestine, and the picturesque old shepherd with his flock shows that practically no change has been made in this homely occupation since the days of which we read in the Holy Bible. It may be that the distant hills are part of the mountains named in the Scriptures

THE HOLY LAND

PALESTINE, the "Holy Land," where Christ walked and taught nearly two thousand years ago, was placed under the care of Britain by the League of Nations after the war of 1914–18.

Palestine is a little country. You could go from one end of it to the other by motor car in a morning, and you could cross it from the Mediterranean Sea to the River Jordan in about half that time, if the road was good. It is amazing to think that the wonderful things which are recorded in the Bible — events that changed the whole history of the world and made it a better place in which to live—happened in a tiny country like this. The Holy Land of the Bible was not so large as Wales; the Palestine of to-day is smaller still.

Although along the coastal plain you find ports and towns in close touch by steamers and telegraphs, by wireless and the aeroplane, with the busy world outside, and although there are places where modern engineers have built great bridges to carry the railways and dams to hold back water for irrigation or for power-stations, there are many parts of Palestine where people live their lives in the old way.

The little villages on the hilltops and in the fertile valleys are still in the same old spots, and the peasants live there in much the same simple fashion as their forefathers did in the days of King David. Many still bear the

IN THE LAND OF SYRIA



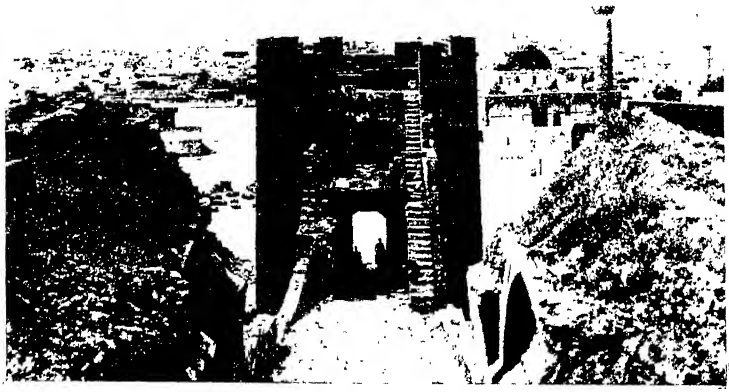
The land of Syria is frequently mentioned in the Bible, and we find it on a map immediately to the north of the Holy Land. The ruined castle illustrated above is known as the "Kadi-fekalasi," and was once an acropolis or citadel. Syria was until recently ruled by the French, but has been granted independence. The castle in part now forms a wireless station.



Photos, R. N. A.

Alexandretta is a Turkish township to the north of Syria on the shore of a gulf of the same name, which opens from the Mediterranean. Our picture takes you in imagination to a characteristic street in the ancient quarter of the town, where dirt and squalor appear to rule and the small boy plays happily on the edge of a puddle.

AT THE HITTITE CITADEL OF ALEPPO



E. N. A.

We must go to the northern part of Syria to find Aleppo, which, from the picture above, is a large, widespread township. The town forms a most important centre for the collection and distribution of goods and merchandise from a broad area, and its narrow streets are usually thronged with the merchants of many nations. The photograph was taken from the Citadel.



Will F. Taylor.

This harbour, thronged with steamers and ocean-going craft as well as with native boats, is that of Beirut, the chief port of Syria and one of its most important cities. In this place you would notice at once how the affairs of the West blend with those of the East, in buildings, manners and customs and every other way.

ancient names as well as their Arab ones, and look much as they must have appeared thousands of years ago. The world's rapid progress seems to have passed them by.

Lebanon and the Jordan.

To understand Palestine you must look at it on the map with Syria, which is ruled by the French, and which lies to the north of the Holy Land. Large parts of what is now called Syria were included in the Holy Land of ancient days. In the north are the mountains of Lebanon, where you will still find some of the descendants of those wonderful cedars which Hiram, King of Tyre, felled to send in great rafts along the sea coast to be used by King Solomon in the building of the Temple at Jerusalem. Mount Hermon still lifts its snowy crest into the blue, and the clear streams still flow down from Lebanon to water the oasis city of Damascus and the cities of the plain.

From Lebanon the great river Jordan flows southwards between "the desert and the sown," first through the Sea of Galilee on whose shores are the places where Christ lived and taught, and on whose waters He and His disciples often went in a fishing boat; and then, after a long and winding course at the bottom of a deep and hot valley-trench, the river enters the Dead Sea, a sea so salt that people bathing in it find it difficult to swim because so much of their bodies is buoyed up out of the water. Its shores look "dead," indeed, for hardly a living thing is to be seen there; it seems like a great salt lake in the heart of a desert. Beyond those high shores on its eastern side, indeed, there *is* real desert—the Syrian Desert that stretches in an arid stony waste all the way from the Jordan to the great twin rivers of Mesopotamia, which in these days is called Iraq.



BY THE WALL OF DAMASCUS *Will F. Taylor.*

We read in the Scriptures of how St. Paul escaped from Damascus by the city wall, and this illustration shows us in a modern picture what is thought to have been the exact spot. Damascus is the capital of Syria, and has a population of nearly a quarter of a million.

The Hill Country.

Between the Jordan and the Mediterranean Sea, Palestine rises in a long ridge of limestone hills, which have been carved by the weather of the ages and by running water into deep valleys, leaving

A PEEP AT THE HOLY LAND



Photo: H. J. Shepstone

Few of us as we read the beautiful Bible stories can fail to hope that at some time during our lives we may have the privilege of touring in the Holy Land. Next to a personal visit, however, come realistic pictures and here is a photograph of the Via Dolorosa or "Street of Pain" along which it is believed that Christ struggled, bearing the Cross upon His shoulder.

KNEELING AT THE WALL OF PRAYER



Photo: H. J. Shepstone

The Damascus Gate, one of the four chief or main entrances to and exits from Jerusalem, stands to the north of the City. Here, gathered within the Gate, are tribesmen engaged in marketing, before setting off on a journey, whilst their patient camels wait to be loaded.



Photo: H. J. Shepstone

The Wailing Wall or Wall of Prayer is sacred to the Jews and has been so from earliest days because here were massacred countless of their ancestors. Jews and Mohammedans occupy separate quarters of the City, but between them feeling has always run high.

THE MOUNT OF OLIVES TO-DAY



Photo: Will F. Taylor

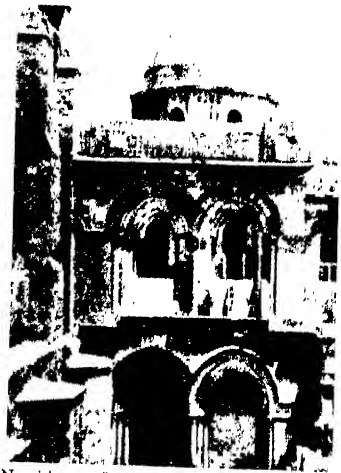
One of the finest views of the City of Jerusalem is that from the Mount of Olives on the eastern side, and our picture gives an excellent idea of this eminence. The Holy City of to-day embraces separate quarters for Christians, Jews and Mohammedans.



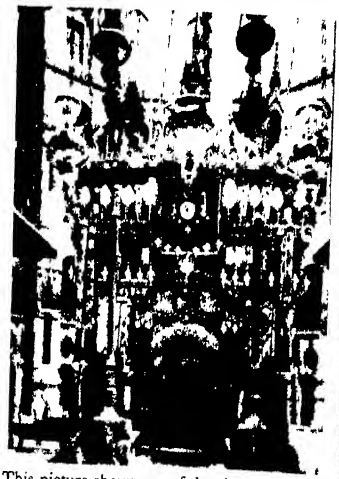
Photo: Keystone View Co.

This is known as the Old Wall of Jerusalem, but it is not the one which existed in the time of Christ, for the Romans so beset the City that "not one stone remained upon another." These walls were built in 1542 during the city's long Mohammedan occupation which ended in 1917.

"GOOD TIDINGS OF A SAVIOUR'S BIRTH"



No visitor to Jerusalem would miss seeing the Church of the Holy Sepulchre. To this spot pilgrims have come through the centuries, for the original structure was erected in 335.



This picture shows one of the chapels, believed to cover the tomb of our Saviour. Beyond this screen is a further chapel. A second chamber is the Holy Sepulchre itself.



In the Garden of Gethsemane on the Mount of Olives and within a mile of Jerusalem is the Tree of Agony, here depicted and referred to in the Bible.



Photos: H. J. Shepstone

This is a further view taken in Jerusalem showing us the entrance to the Tombs of the Kings. Some 50,000 people make their homes in the sacred City.

heights outstanding, many of which are crowned with villages, some with towns. The city of Jerusalem, indeed, stands on just such a height; the Crusaders found it hard to take because on three sides it was defended by deep valleys from which the hillside rose steeply almost like the walls of a castle.



Will F. Taylor.

"THE STREET WHICH IS CALLED STRAIGHT"

One of the chief main streets of Damascus is covered for part of its course by an arched roof, so forming what is known as the "covered street," here shown. The portion beneath the roof is used as a bazaar, and presents a most animated scene during business hours.

At Jericho.

The limestone hills look dry and barren. You find it hard to believe that even goats could obtain a living there, yet on their grey slopes there are not only goats but flocks of sheep which still follow their shepherds as they did in the days of the Bible story. There are fertile spots, too, where the toiling peasants till the stony soil, still ploughing it with the old primitive ploughs and scattering the seed broadcast, reaping the thin harvest with the sickle, and winnowing out the grain by the old-fashioned threshing floors made in open places, so that the wind can blow away the chaff when the grain trodden out by the oxen is cast up into the breeze by the wooden shovels of the harvesters.

The hill country is nearer the Jordan than it is to the Mediterranean. From the sea you go up a long slope to the hills and Jerusalem, but from the hilltops there is a steep descent to Jericho and the Jordan valley. Recent excavations at Jericho have revealed the aged walls of the city of Old Testament times; like those streets of Jerusalem along which Christ and His disciples walked, they are buried deep

WHERE CHRIST WAS BORN



Spark and General.

The scene here depicted is the main or front entrance to the Church of Nativity in Bethlehem, the sacred structure reared over the very spot where Christ was born. The briefest study of this picture carries us in thought to that Christmas of long, long ago—the first Christmas of all time. We think of the manger, the lowly birth and the shepherds.

A VIEW IN "ROYAL DAVID'S CITY"



American Colony, Jerusalem.

The scene reproduced above affords us a general idea of the city of Bethlehem, which was the birthplace of our Saviour and the royal home of King David. Bethlehem is only some five miles distant from Jerusalem. The meaning of the word is "house of bread," and the place is a centre for religious interests of many kinds.

beneath the earth which has collected there through the ages.

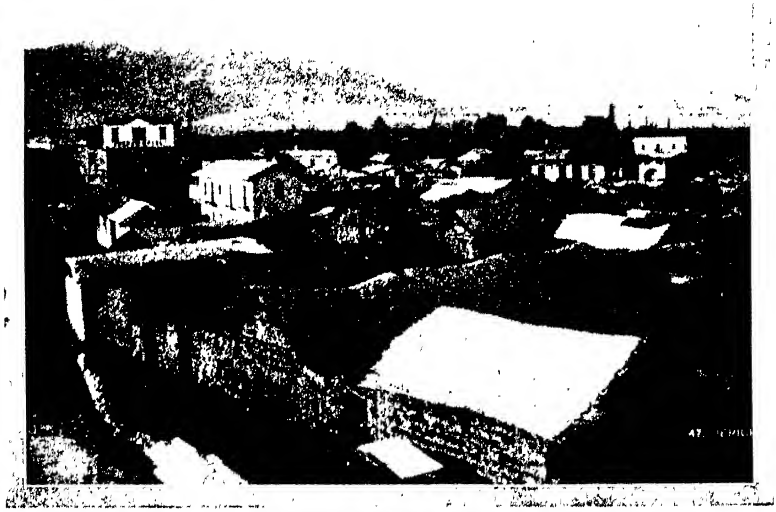
The Rich Plains.

The richest plains are along the shores of the Mediterranean, especially in the neighbourhood of Jaffa (the ancient Joppa), where fine oranges and other fruits grow in the well-irrigated gardens. Grain, the vine and the olive flourish in sunny, fertile spots on these coastal lowlands. Jaffa oranges are ready just in time for Christmas. Numbers of Arab and Jewish people are engaged in the orange groves, picking, grading and packing the golden fruit, which is then taken by motor lorries to large sheds for inspection.

The cases of oranges are next taken out to the steamers anchored off shore. Over two million cases of Jaffa oranges came to Britain in a recent peace-time season.

Villages in the plains are of stone or of sun-baked brick, with flat roofs of rolled clay or beaten earth. It is not uncommon for such house roofs to be covered with a thin growth of herbage upon which enterprising goats may graze. Many housetops provide space for drying and storing grain, fuel and fruits, as well as for the inhabitants to "take the air in the cool of the evening."

The rooftop is reached from the ground by a flight of steps outside. Inside, most large village houses have a platform or *mastabeh* raised well above the lower part or *rowyeh* in which animals are kept, and where the people may sleep if the upper part, which is really the living-room, is too crowded. Light and air come through one or two tiny windows high in the wall and without glass in them. Warmth in winter and opportunities of cooking are provided by the little fire in the



American Colony, Jerusalem.

JERICHO AS IT IS TO-DAY

On the site of the ancient city of Jericho the present-day township has been reared, as depicted above. Jericho is in the Jordan Valley, and we can see in the distance in this photograph the Mount of Temptation. Excavations in quite recent years have brought to light some of the city walls of the Jericho which figured in the Old Testament.

stone fireplace. There is scanty furniture; these peasant folk live very simply and their needs are few.

Village Hospitality.

In most large villages the headman or sheikh still takes care that the guest-chamber is always ready for travellers who come that way, and sees that villagers take their proper turns to supply this room with food and drink when strangers arrive. The guest-chamber is generally a large room at the top of one of the more important houses in the villages. A really distinguished guest will be offered roast lamb or chickens; sweet and very thick black coffee will be served, and fruits both fresh and dry will be laid before him. Less important people, however, are contented with bread and olives, and perhaps eggs, fruit and coffee. Whether a visitor be rich or poor, distinguished or unknown, care is taken to see that his animals are well looked after.



Will F. Taylor.

A HUMBLE CARPENTER'S SHOP

We read in the Scriptures that our Saviour was known as a carpenter, and here we see a simple carpenter's shop of our own times in the town of Nazareth. It was at this town, not far from the Sea of Galilee, that Christ made His home at one time.

Hill villages are built of stone taken from the hill itself; the houses huddle closely together on the slopes or even on the very hilltop, their dusty, crooked and unpaved streets making things difficult for people on foot if a laden camel comes that way. The backs of the houses face the street; there are no such things as "front gardens" here. Stone sheepfolds are attached to many of these houses, for the chief wealth of these simple villagers is in sheep and goats which browse on the thin pastures of the grey hillsides. Lower down there may be little patches of fertile soil in which the peasants manage to grow grain, fruits and vegetables.

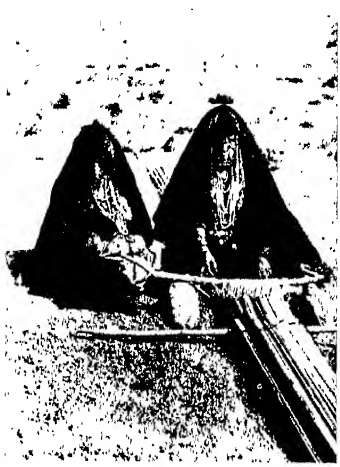
In such villages as these the people live in much the same fashion and dress in much the same way as their forefathers did in the days of Abraham. Many of them are Moslems—followers of Mohammed—and the language they

PEOPLE OF TO-DAY IN THE HOLY LAND



American Colony, Jerusalem.

The picturesque figure here seen is that of a priest or rabbi in Palestine. He represents the type of Hebrew of Biblical days.



Will F. Taylor.

These Bedouin women from the Sinai district are engaged in the weaving of cloth by the simple methods of long, long ago.



American Colony, Jerusalem.

This old native is occupied in measuring corn "pressed down, shaken together and running over," in the words of the Bible.



American Colony, Jerusalem.

The man here seen was snapped in the city of Jerusalem. He is occupied with the spinning of yarn from a tangle of wool.

WORKING WITH HANDS AND TOES



American Colony, Jerusalem.

We have already seen a carpenter's shop at Nazareth, and here is a native carpenter at work making crosses and other souvenirs for visitors. The whip-like object in his right hand rotates a drill by means of a strap attachment, and you will see that the piece of olive wood upon which he is engaged is held firmly on the block with his toes. Craftsmen of the East often employ the feet as well as their hands when opportunity offers.

speak is usually a kind of country Arabic. In recent years many more Jews have come to Palestine and settled along the seacoast or in the bigger towns. Their coming has angered the Arabs and British forces have been sent to maintain order.

The Changing Seasons.

Winters are cold in the open hill country, bringing chilly rains and sometimes snow, and the peasants and shepherds are glad of their thick woollen robes and their coats of sheep skin. When spring comes, it brings with it a magic change, for green things grow up in all sorts of unexpected places as well as in the fertile spots, and for a time the hillside is gay with flowers. But the summer sun soon withers the flowers and burns up the grass, and the land becomes parched and dry, except in those fortunate places supplied by water from wells or irrigation channels.

Grain is sown just after the rains, and beans and lentils are also sown in the moist red soil. Camels and asses as well as oxen are yoked to the rough wooden ploughs, which plough shallow furrows so that the precious moisture shall not be lost. The grain is reaped with toothed sickles and carried to the threshing floors of hard earth, where oxen tied side by side tread out the grain with their wide iron shoes. The grain is winnowed by throwing it up so that the chaff may blow aside, leaving the wheat in a heap by itself. The grain is then carefully sifted in big sieves to make sure that it is quite clean.

Most of the hill-folk spin wool from their sheep, and the yarn is woven on handlooms in many districts to make the woollen stuffs so widely used for clothing. In the towns, however, people buy the cheap brightly-coloured stuffs woven in the great factories of Middle

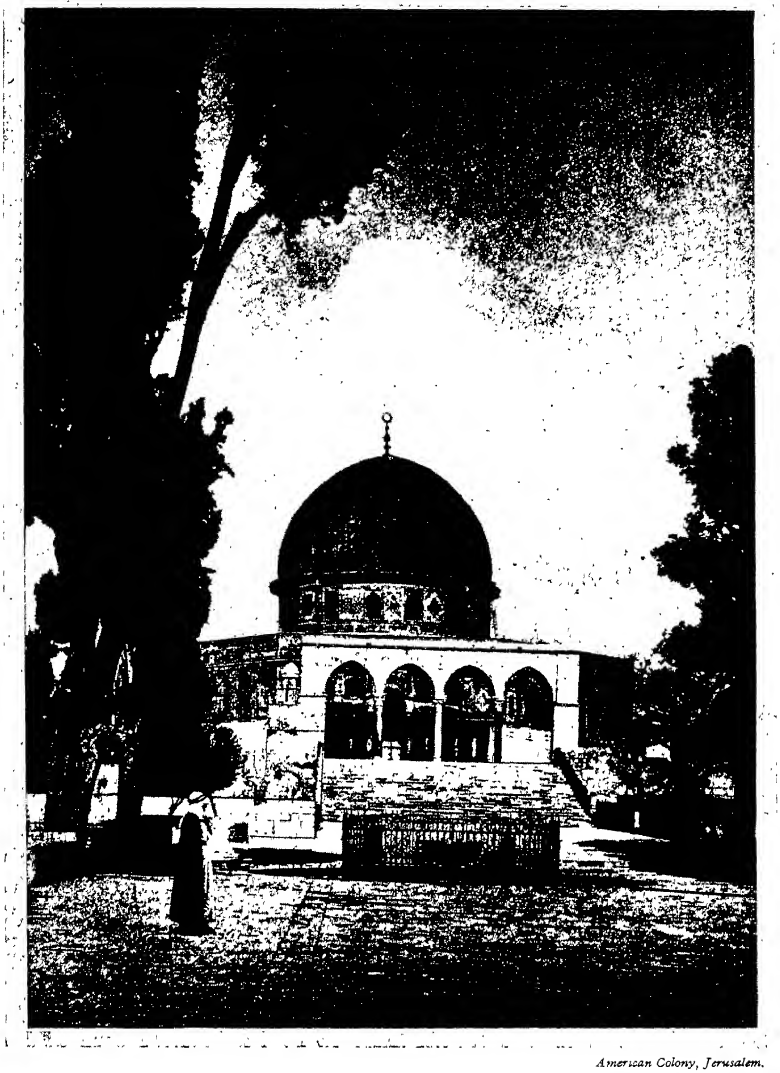


H. J. Shepstone.

ILLUSTRATING A BIBLICAL PARABLE

The lonely building here depicted is the Good Samaritan's Inn on the road to Jericho. Travellers in the Holy Land are often accompanied by sheep and other animals, who must be accommodated like themselves—hence the spacious stockyard. The inn is identified with Christ's parable of the man who fell among thieves.

THE DOME OF THE ROCK



American Colony, Jerusalem.

One of the most entrancing architectural structures in the world is the Dome of the Rock, an edifice sacred to the Moslems to be found in the temple area of Jerusalem. It is said that this building occupies the site of the Great Temple of King Solomon. One must ascend a large number of steps to reach the entrance to this building, the most arresting feature of which is its mighty dome.

A "GRAND CANYON" OF THE HOLY LAND



American Colony, Jerusalem.

The deep, dark gorge here seen, which makes us think of the Grand Canyon of Colorado, is the path cut in the rocks by the River Arnon, whose waters pour into the Dead Sea, seen beyond. Bathing is most difficult in the Dead Sea and fish are unable to exist in it because of the presence of so much salt. Its North end is about 25 miles East of Jerusalem.

BY THE SHORES OF THE DEAD SEA



Photos : American Colony, Jerusalem.

A most interesting point about the Dead Sea is the fact that it is about 1,300 feet below the level of the Mediterranean. It receives the water of the Jordan and other rivers, and yet there is no outlet, so that the fluid evaporates under the fierce sun. In the top left-hand corner is a collection of crystals These crystals are of salt, and were found by the shores of the Dead Sea.

PALESTINE'S PORT OF JAFFA



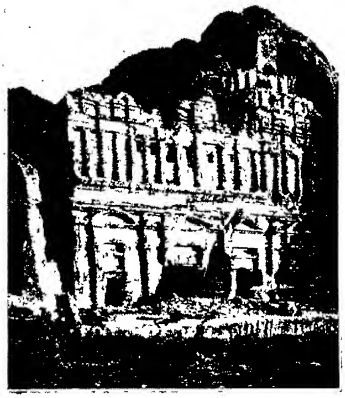
We think of large, luscious oranges in connection with Jaffa, here pictured, and the place has many beautiful orange groves. It is Palestine's great seaport, and we read of it in the Bible under its old name, Joppa. To the busy wharves heavily laden camels come with their loads of fruit and other produce. The city is built upon rising ground, but the waters of its harbour are not sufficiently deep for very large vessels, so cargoes are sent to them in barges.



Photos : E. N. A.

Here we are looking across open fertile country from the slope of Djebel Mountain at the large town of Gaza, which is interested almost entirely in agricultural produce. Alexander the Great knew Gaza long before the time of Christ, and it was once a city of the Philistines. We find Gaza near the coast at the south of Palestine.

HEWN IN THE LIVING ROCK



American Colony, Jerusalem.

Petra is a city of Arabia long since perished except for its remains of rock-hewn temples and tombs, of which the "Corinthian" tomb above is an example.



American Colony, Jerusalem

These tombs were hewn out of the living rock 2,000 years ago, and the one above towers 120 feet in height. It is known as the Temple of El Khazneh.



American Colony, Jerusalem.

Petra can only be reached through this sik, or narrow gorge. The ravine is a mile in length, lined on either side with tombs, niches and inscriptions.



Will F. Taylor.

In this picture we see the Temple of El-Deir, and there are hundreds of tombs in the sandstone rock. Egyptians, Greeks and Romans knew Petra.

and Western Europe and brought to Palestine either by sea or by the railway that comes through from the north by way of Asiatic Turkey and Syria.

Railways and Airways.

Nowadays, Palestine is in touch not only with Asia Minor, but also with Egypt and Arabia by the railways; and the great aeroplanes, used to carry mails and passengers to Baghdad from Egypt and on to India, pass over the southern part of the Holy Land, where one or two large aerodromes have been made. Another route to Baghdad from Palestine is by rail to Damascus, the oasis city-capital of Syria, and thence by desert motor car across the Syrian Desert to the valley of the Tigris-Euphrates and the old caravan city of Baghdad.

The Wonders of Petra.

Far away out in the dry country, nearly two hundred miles from Jerusalem, but fairly near the long railway line that links Damascus with the Holy City of Medina in Arabia, are the wonderful ruins of *Petra*, "the rose-red city half as old as Time." Petra's rock-hewn temples and tombs and its theatres and terraces carved in the red rock by master-masons two thousand years ago stand in a place that was easily defended, for its only approaches were by narrow defiles which a handful of men could have held against an army.

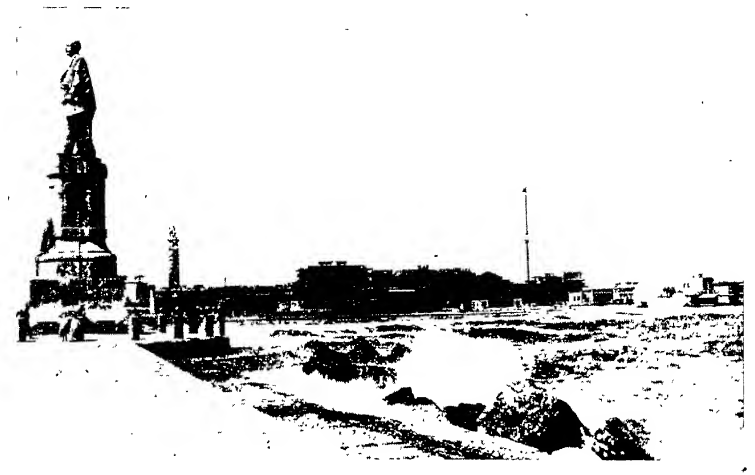
Among the wonders of Petra are the beautiful front of the Temple of Isis, and the great amphitheatre which could seat three thousand people. Petra was at the height of its glory in the early part of the second century.



Will F. Taylor.

IN THE VANISHED CITY OF PETRA

Here we have a view of the front of the great High Place at Petra. Among the ruins of this lost city are those of an amphitheatre which could provide seating accommodation so that 3,000 spectators might view the sights in the arena below.



Will F. Taylor.

A GATEWAY TO THE SUEZ CANAL

The wonderful canal which connects the blue Mediterranean with the Red Sea begins at Port Said, a most important town which is shown in the photograph. In the foreground, at the end of the mole or jetty, is a statue of Vicomte de Lesseps, the French engineer who projected this waterway. The Suez Canal was opened in 1869, having taken eleven years to construct.

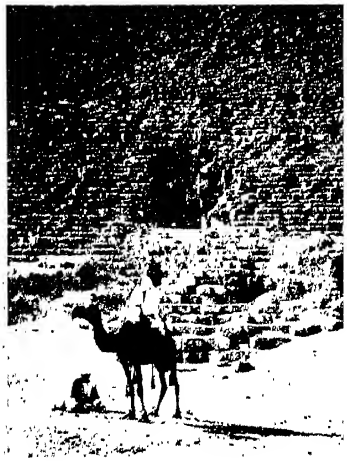
EGYPT: AND THE NILE

"EGYPT," said the ancients, "is the gift of the Nile." It is not until we visit Egypt that we realise how exactly true this is. The real Egypt is the narrow valley of the Lower Nile and its rich fan-shaped delta. It was in the Nile Valley that the wonderful civilisation of Ancient Egypt arose thousands of years before the Cæsars of Rome set their iron rule upon the Mediterranean world of their day. Only a river like the Nile, with its yearly flood that enriches the valley and gives life to everything in it, could have made an almost rainless country like Egypt the home of a mighty people who at one time held sway over nearly the whole of the known world.

The Nile.

The Nile, whose steady flow is maintained by the great lakes of the East African plateau, begins to rise about the middle of July—soon after the heavy rains have begun to fall in the Abyssinian highlands, and it is this heavy summer rain brought down by the Atbara and the Blue Nile tributaries that is the real cause of the regular Nile flood that reaches its highest level in Egypt in September. To control this flow, and to make it

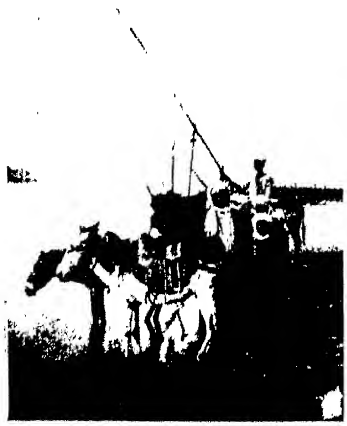
SIGHTS AND SCENES IN EGYPT—



In this picture we are shown the entrance to the Great Pyramid. The wonderful building has several inner chambers.



Here is a typical Mohammedan woman such as you might meet in the streets of Cairo. She is wearing the usual short veil.



The real Egypt of mystery is in the valley of the Lower Nile, and here donkey boys are illustrated on the banks of this river.



Photos: H. J. Shepstone.

This charming cameo of the desert affords a splendid general view of the Pyramids of Gizeh. The Pyramids of Egypt were tombs.

THE MYSTERY LAND OF THE PHARAOHS



This is a typical Bisharin boy, some of whom you would see during a visit to Egypt. He is rather short and of slight build.



This is next best to an aerial view, and shows you what Cairo looks like from the heights of the Mokattam Hills.



Here is another view of Cairo, taken this time from the top of the Citadel. Beyond you see the famous Pyramids of Gizeh.



Photos: H. J. Shepstone.

A companion picture is here provided for the one above on the left, for it shows a Bisharin girl, photographed at Cairo.

serve greater areas than it used to do in ancient times, great dams or barrages have been constructed by British engineers. The most famous of these barrages in Egypt is the Assouan Dam (built 1898–1902) at the first of the six great cataracts of the Nile; and there are others at Asyut and at Zifta (below Cairo).

Cairo and the Pyramids.

The pleasantest time for us to visit Egypt is between October and April, especially during November or December, when the weather is at its best for people coming from Europe; and the only way to see Egypt and its wonderful monuments of a mighty and glorious past is by the Nile itself, on which fine steamers ply regularly up and down for the convenience of tourists.

Cairo will be our starting point—an amazing city that is both old and new. The new Cairo has fine buildings, great modern hotels, and broad, shady avenues along which are shops, theatres and cafés as good as any in Paris or Vienna. The old Cairo still has its crooked, narrow streets, its balconied houses with windows discreetly covered with screens of pierced woodwork or with metal grilles, its mosques with tall, slender minarets and long glazed tiles, its bazaars, and its seething native life.

Across the Nile from Cairo is Gizeh, where the famous Pyramids and the Sphinx are within easy reach by car, tram or carriage—only nine miles from Cairo itself. Whilst at Cairo, we should certainly visit the ancient city port of Alexandria, founded by Alexander the Great in 332 B.C. Alexander is



H. E. Watterson.

THE SPHINX AT GIZEH

No one can estimate the age of this gigantic figure, carved in rock and partly buried in the sand. It is to be found in Lower Egypt, and is a man-headed lion. The figure is nearly 200 feet in length, and the face of the monster 14 feet wide. Between the paws are the remains of an open-air temple. The Sphinx in various forms appears in other parts of Egypt.

THE PYRAMID OF CHEOPS



H. E. Watterson.

The Great Pyramid of Cheops is at Gizeh, and is spoken of as one of the seven wonders of the world. Cheops was an Egyptian king, and the Pyramid forms his tomb. It is estimated that this marvellous pile contains masonry weighing upwards of 6½ million tons. In height it far exceeds the summit of the spire of Salisbury Cathedral. It is said that 100,000 men worked at the task of building over a period of 20 years.

said to have been buried there in a golden casket. Even in recent years archæologists have been searching for his tomb, mostly beneath old mosques in the city, but so far no discovery has been made in this connection.

Wonders of Ancient Egypt.

Leaving Cairo by Nile steamer, we view the city in its real setting—the green Nile with splendid buildings on both banks, the bold Mokattam Hills with the Citadel almost at their feet, and away to the westward the three Pyramids of Gizeh at the desert's edge. Two or three hours bring us to a point whence we set out on donkey back with our gorgeously-clad dragomans to see all that is left of ancient Memphis, the old capital of the Pharaohs, and its vast Necropolis in which the great ones of old time were buried with all that care and religious ceremonial which was observed in Ancient Egypt by a people who believed in preserving their bodies for use in the life beyond the grave.

Vivid pictures of life in Ancient Egypt are to be seen in the marvellous paintings on the walls of tombs near Beni Hassan, which we visit after about two days' journey upstream from Cairo on the broad Nile that here flows between red sandstone cliffs, with the green of cultivated fields between them and the river.

On the seventh day after leaving Cairo the tall temple pylons of Karnak appear, and the beautiful colonnades of the temple of Luxor—both worthy of their place among the wonders of the world. It was on the opposite (western) bank that the Egyptians built their capital of Thebes, which we shall visit to see the Tombs of the Kings—and certainly the tomb of Tutankhamen, which has been discovered in our own time and has revealed to an astonished world yet more of the buried secrets of the Egypt of long ago.

The Assouan Dam.

Twelve days from Cairo we reach Assouan, and cross the mighty dam by trolley car, so that we may appreciate its tremendous size. We go in boats to see the lovely Temple of Philæ, and the famous Nilometer on Elephantine Island; and next day start regretfully on our return journey to Cairo.



Major J. Mulholland.

THE GOVERNOR-GENERAL'S PALACE AT KHARTOUM

Khartoum is the capital of the Anglo-Egyptian Sudan, and stands where the Blue Nile meets the White Nile. The heroic General Gordon made Khartoum his headquarters, and in the town he lost his life. At the Battle of Omdurman, Lord Kitchener won back Khartoum and took his title from this place.

IN THE TEMPLE AT LUXOR



H. J. Shepstone.

Luxor, which stands upon the Nile in Upper Egypt, is the ancient city of Thebes. It has been the scene of much recent excavation, and is visited by many tourists who find it a healthful resort, and come to see the ruins. Above are illustrated some of the columns of Luxor Temple.

THE LAND OF MESOPOTAMIA



F. Kingdon Ward.

ARABS OF THE DESERT

Mesopotamia, or Iraq, as we call it to-day, is really the Valley of the Tigris-Euphrates. It is hemmed in by the desert, and here you see a picturesque encampment of Arabs amidst the sandy wastes away to the east of Baghdad.

THE valley of the Tigris-Euphrates, which the Greeks named Mesopotamia, "the land between the Rivers," and which to-day we call Iraq, was, like Egypt of old, one of the first cradles of civilisation; and, like Egypt of to-day, it is a wonderful storehouse of history. Yellow mounds, long barren amid the fertility of the plain, were proved to contain the ruins of mighty cities of the past—of Babylon and Nineveh; and eager excavators soon revealed the walls of temples and palaces that Nebuchadnezzar knew, and the very streets along which the exiled Israelites must have walked in the days of the Captivity.

Ur of the Chaldees.

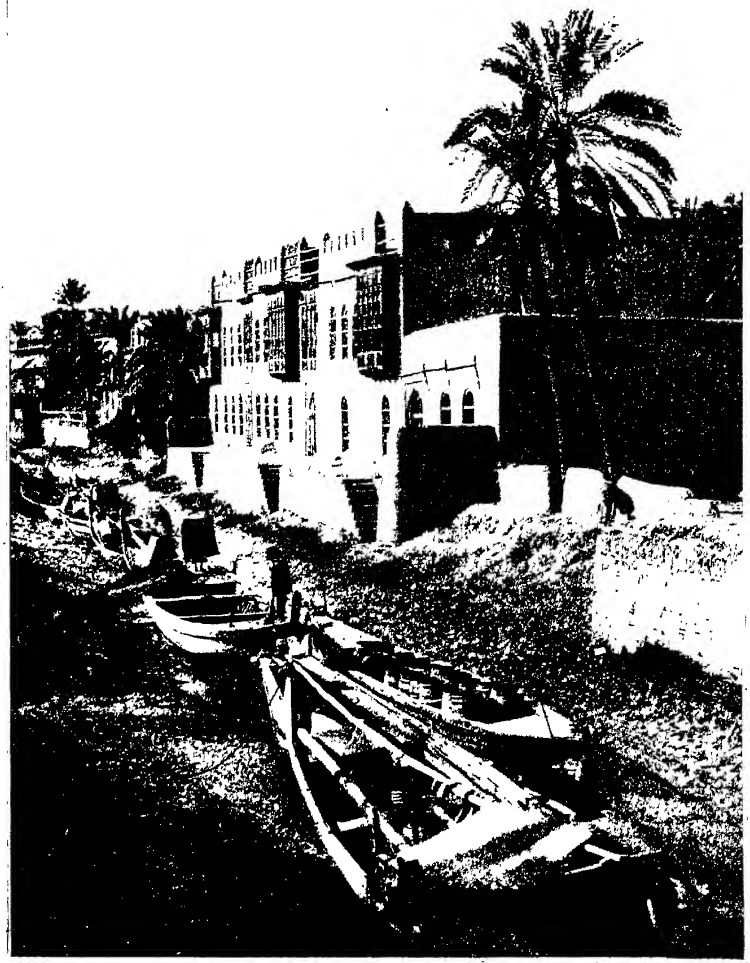
More wonderful even than these in some ways are the discoveries recently made at Ur of the Chaldees, the city of the plains whence Abraham started on his long journey to the west, where he founded a nation in the Land of Israel. Here modern scientists have discovered relics of remote antiquity dating back far beyond 3200 B.C. in the ancient burial grounds of the city, reaching far into times that are prehistoric.

Like Egypt, Mesopotamia is hemmed in by the desert, which is never very far from "the sown"—the cultivated field. Summer heat is so great in many places as to be unbearable; flies, mosquitoes and the fevers they carry render life uncomfortable to human beings; and the winter half-year brings days that are as chill and raw as summer days are hot and stifling.

Tradition says that the Garden of Eden was in the lower Tigris-Euphrates Valley. Tigris is the river Hiddekel of the book of Genesis, and the plain was the Plain of Shinar, upon which the Tower of Babel was upreared like one of those huge ziggurats whose foundations archæologists have uncovered at Babylon and other places in the broad and sand-strewn valley.

The City of the Arabian Nights.

The centre of modern Iraq is the famous old city of Baghdad on the Tigris—the city of the "Arabian Nights" where the great Caliph Haroun el Reshed once held sway. To-day you



F. Kingdon Ward.

The Port of Basra, here shown, has near it the greatest date groves in the world. The town stands on the Shat-el-Arab, the river formed by the union of Tigris and Euphrates, and our picture illustrates a creek from this river at low tide. Basra was the base for the British military campaign in Mesopotamia during the Great War of 1914–18.

can reach Baghdad from Europe by the Baghdad Railway—or, rather, by what is so far constructed of it and in use.

The Lower Basin.

You leave the station of Haidar Pasha in Scutari (the Asiatic suburb of Constantinople across the Bosporus) and cross the high and dry plateau of Turkey (or Asia Minor, as it used to be called), and go down again to the ancient caravan centre of Aleppo. Then the train goes east to a point not far from Nisibin, whence a motor car service run in connection with the trains takes you to the old city of Mosul on the upper Tigris, which has there emerged from the terrific gorges through which it has cut a way from the northern mountains to the plain.

From Mosul you take car again to the railhead north of Baghdad, and then you board a train that will take you to the City of the Caliphs, and on, if you like, down the Euphrates Valley to the port of Basra, near which are the greatest date groves in the world.

From Persian Oilfields.

Basra is built on the Shat-el-Arab, the river formed by the union of Tigris and Euphrates. It is joined on its left bank by the Karun River from the Persian oilfields, and at Mohammerah you can see the giant oil-reservoirs and large tank steamers filling with oil at the wharves.

Caravans still converge on Baghdad from all points of the compass, as they have done, doubtless, almost since the



Geoffrey Malins, O.B.E., F.R.G.S.

THE GARDEN OF EDEN

On the right bank of the River Tigris, near where it is joined by the Euphrates, and close to the town of Kurna, is the traditional site of the Garden of Eden. Carefully surrounded by a brickwork fence, and held in the utmost reverence by the inhabitants, is the Tree of Knowledge of Good and Evil, shown above. There is a ferry for visitors to the Garden of Eden from Kurna.

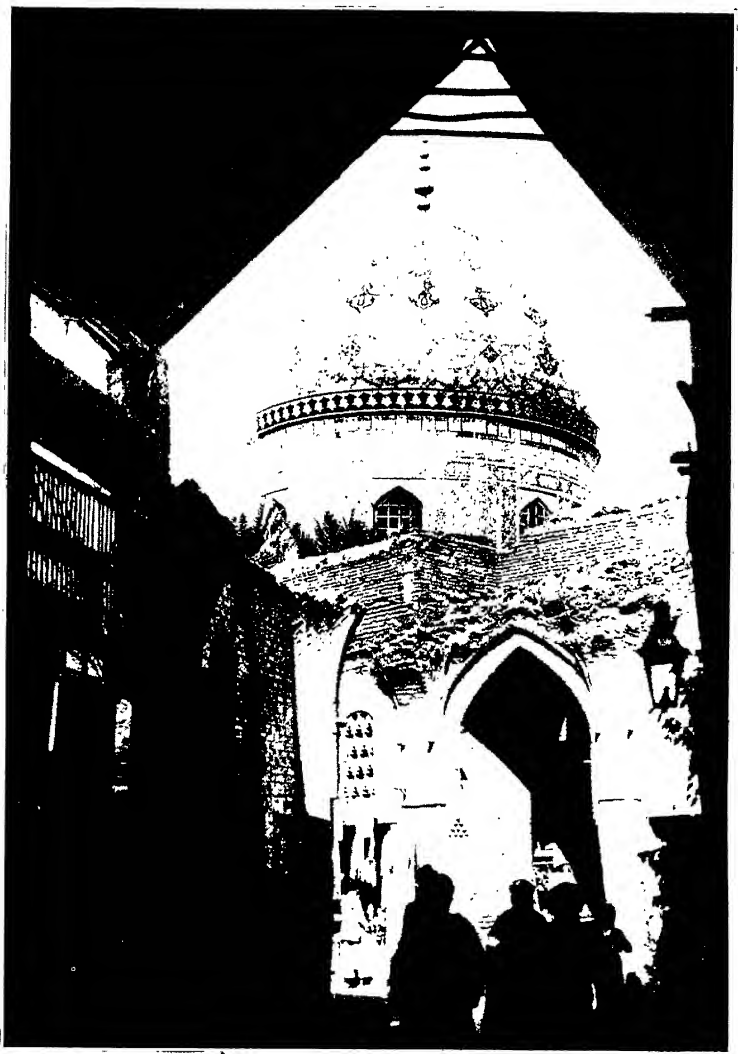


A GAILY-COLOURED STREET IN CAIRO

Cairo is the capital of Egypt as we know it to-day. The city stands upon the right bank of the River Nile (as you look towards the mouth), and the scene above shows us one of the crowded shopping streets or bazaars Here you may rub shoulders with the men of many nations, some with their patient donkeys, and a brighter or more colourful picture it would be hard to imagine.

N P.K. IV, p. 184.

BAGHDAD'S BLUE MOSQUE



E.N.A.

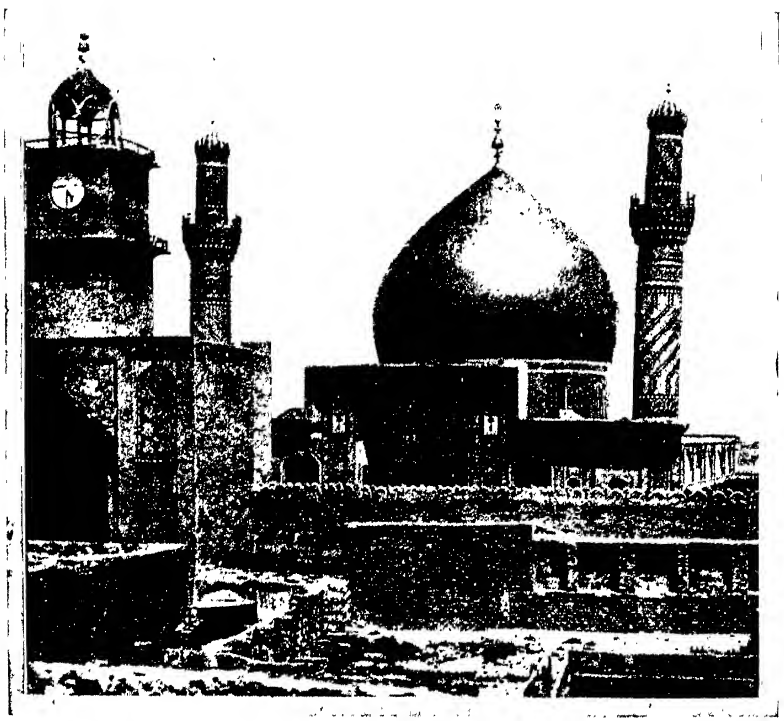
The traveller in Mesopotamia will find here and there a picture which delights the eye. In Baghdad, Mosul, Samarra and certain other places, mosques with domes of blue and gold break the monotony of the desert sands. In Mosul, in the spring, the storks build their clumsy nests on the ledges of many a minaret and dome.

beginning of history; but outside it is the Hinaidi Aerodrome for air liners serving the air mail route to India; and arriving there, too, are the fine "desert cars" of the regular motor service from Damascus and the Mediterranean port of Beirut in Syria.

As in Olden Days.

Yet on the bosom of the Tigris you can still see peasants crossing the river swimming on inflated sheepskins, just as you see men doing so on the famous Assyrian bas-reliefs at the British Museum. You can cross the river in a *goufa*—one of those strange, circular boats which are exactly like those used in Abraham's time; or you can voyage up and down in a *bellem*, or in a *mahaila*, with eyes at the prow and tall, triangular sail; or you can take a comfortable and up-to-date motor launch—whichever you please.

Nowhere else in the world is the remote past closer to the present than in this age-old land of Mesopotamia, where the days of the book of Genesis are linked with those in which we live.



F. Kingdon Ward.

A MOSLEM PLACE OF PILGRIMAGE

Could you possibly imagine a scene more typically Eastern than the one shown above? It features the Golden Mosque at Samarra, a Mesopotamian town on the River Tigris. This mosque is a great place of pilgrimage for pious Moslems.

A Children's Treasury of Verse

Little Masterpieces of To-Day and Yesterday



THE JOY OF LIFE

Here set out in the following pages is an anthology or collection of poems which has been specially prepared for *you*. The poems selected are from the published works of some of our greatest poets whilst, in addition, there are verses written by the most popular children's poets of to-day.

A CHILDREN'S TREASURY OF VERSE

The Lake Isle of Innisfree

I WILL arise and go now, and go to Innisfree,
And a small cabin build there, of clay and wattles made;
Nine bean rows will I have there, a hive for the honey-bee,
And live alone in the bee-loud glade.

And I shall have some peace there, for peace comes dropping slow,
Dropping from the veils of the morning to where the cricket sings;
There midnight's all a-glimmer, and noon a purple glow,
And evening full of the linnet's wings.

I will arise and go now, for always night and day
I hear lake water lapping with low sounds by the shore;
While I stand on the roadway, or on the pavements gray,
I hear it in the deep heart's core.

W. B. Yeats.

Big Steamers

"OH, where are you going to, all you Big Steamers,
With England's own coal, up and down the salt seas?"
"We are going to fetch you your bread and your butter,
Your beef, pork, and mutton, eggs, apples, and cheese."

"And where will you fetch it from, all you Big Steamers,
And where shall I write you when you are away?"
"We fetch it from Melbourne, Quebec, and Vancouver—
Address us at Hobart, Hong-Kong, and Bombay."

"But if anything happened to all you Big Steamers,
And suppose you were wrecked up and down the salt sea?"
"Then you'd have no coffee or bacon for breakfast,
And you'd have no muffins or toast for your tea."

"Then I'll pray for fine weather for all you Big Steamers,
For little blue billows and breezes so soft."
"Oh, billows and breezes don't bother Big Steamers,
For we're iron below and steel-rigging aloft."

"Then I'll build a new lighthouse for all you Big Steamers,
With plenty wise pilots to pilot you through."
"Oh, the Channel's as bright as a ball-room already,
And pilots are thicker than pilchards at Looe."

"Then what can I do for you, all you Big Steamers,
Oh, what can I do for your comfort and good?"
"Send out your big warships to watch your big waters,
That no one may stop us from bringing you food.

"For the bread that you eat and the biscuits you nibble,
The sweets that you suck and the joints that you carve,
They are brought to you daily by all us Big Steamers—
And if anyone hinders our coming you'll starve."

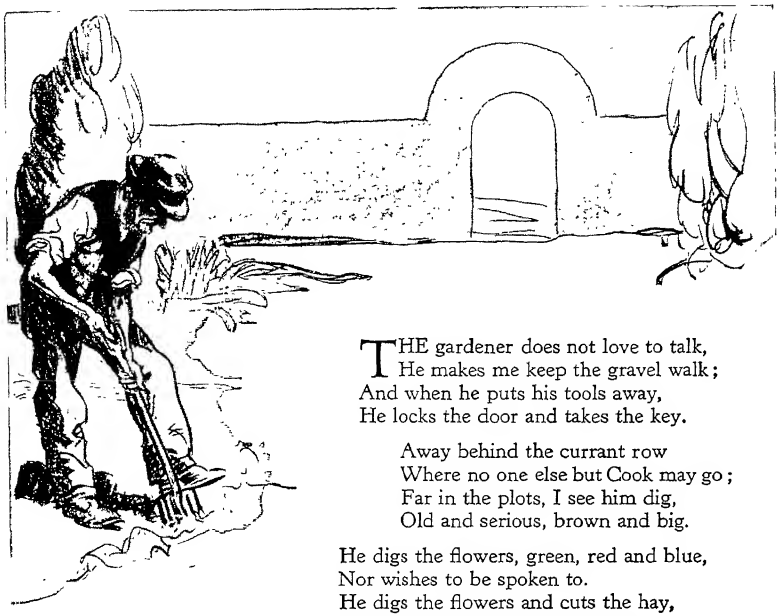
Rudyard Kipling.

I Know A Bank

I KNOW a bank where the wild thyme blows,
Where oxlips and the nodding violet grows,
Quite over-canopied with luscious woodbine,
With sweet musk-roses, and with eglantine:
There sleeps Titania, some time of the night,
Lull'd in these flowers with dances and delight;
And there the snake throws her enamell'd skin,
Weed wide enough to wrap a fairy in.

William Shakespeare.

The Gardener



THE gardener does not love to talk,
He makes me keep the gravel walk;
And when he puts his tools away,
He locks the door and takes the key.

Away behind the currant row
Where no one else but Cook may go;
Far in the plots, I see him dig,
Old and serious, brown and big.

He digs the flowers, green, red and blue,
Nor wishes to be spoken to.
He digs the flowers and cuts the hay,
And never seems to want to play.

Silly gardener! Summer goes,
And winter comes with pinching toes,
When in the garden bare and brown
You must lay your barrow down.

Well now, while the summer stays,
Profit by these garden days!
O how much wiser you would be
To play at Indian wars with me!

Robert Louis Stevenson.



UP the airy mountain,
Down the rushy glen,
We daren't go a-hunting
For fear of little men;
Wee folk, good folk,
Trooping all together:
Green jacket, red cap,
And white owl's feather!

Down along the rocky shore
Some make their home,
They live on crispy pancakes
Of yellow tide-foam;
Some in the reeds
Of the black mountain-lake,
With frogs for their watch-dogs,
All night awake.

High on the hill-top
The old King sits;
He is now so old and grey
He's nigh lost his wits.
With a bridge of white mist
Columbkill he crosses,
On his stately journeys
From Slieveleague to Rosses;
Or going up with music
On cold starry nights,
To sup with the Queen
Of the gay Northern Lights.

They stole little Bridget
For seven years long;
When she came down again
Her friends were all gone.
They took her lightly back,
Between the night and morrow,
They thought that she was fast asleep,
But she was dead with sorrow.
They have kept her ever since
Deep within the lake,
On a bed of flag leaves,
Watching till she wake.

By the craggy hill-side,
Through the mosses bare
They have planted thorn-trees
For pleasure here and there.
Is any man so daring
As dig one up in spite,
He shall find their thornies set
In his bed at night.

Up the airy mountain,
Down the rushy glen,
We daren't go a-hunting
For fear of little men;
Wee folk, good folk,
Trooping all together;
Green jacket, red cap,
And white owl's feather!

William Allingham.

A March Day

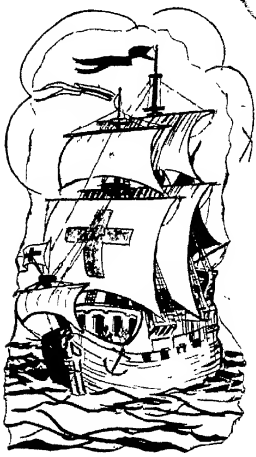
THE cock is crowing,
The stream is flowing,
The small birds twitter,
The lake doth glitter,
The green field sleeps in the sun;
The oldest and youngest
Are at work with the strongest;
The cattle are grazing,
Their heads never raising,
There are forty feeding like one!

Like an army defeated,
The snow hath retreated,
And now doth fare ill
On the top of the bare hill;
The ploughboy is whooping-anon-anon;
There's joy in the mountains;
There's life in the fountains;
Small clouds are sailing;
Blue sky prevailing;
The rain is over and gone!

William Wordsworth.

Cargoes



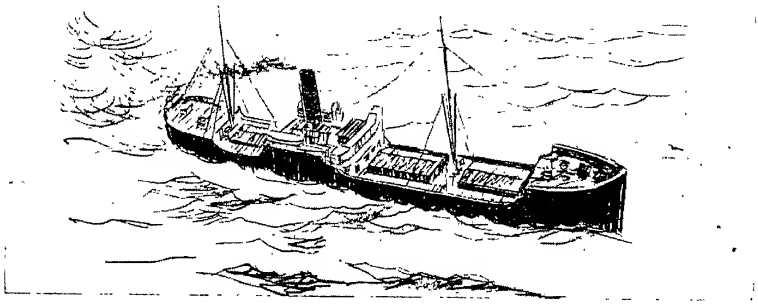


QUIN-QUIREME of Nineveh from distant Ophir
Rowing home to haven in sunny Palestine,
With a cargo of ivory,
And apes and peacocks,
Sandalwood, cedarwood, and sweet white wine.

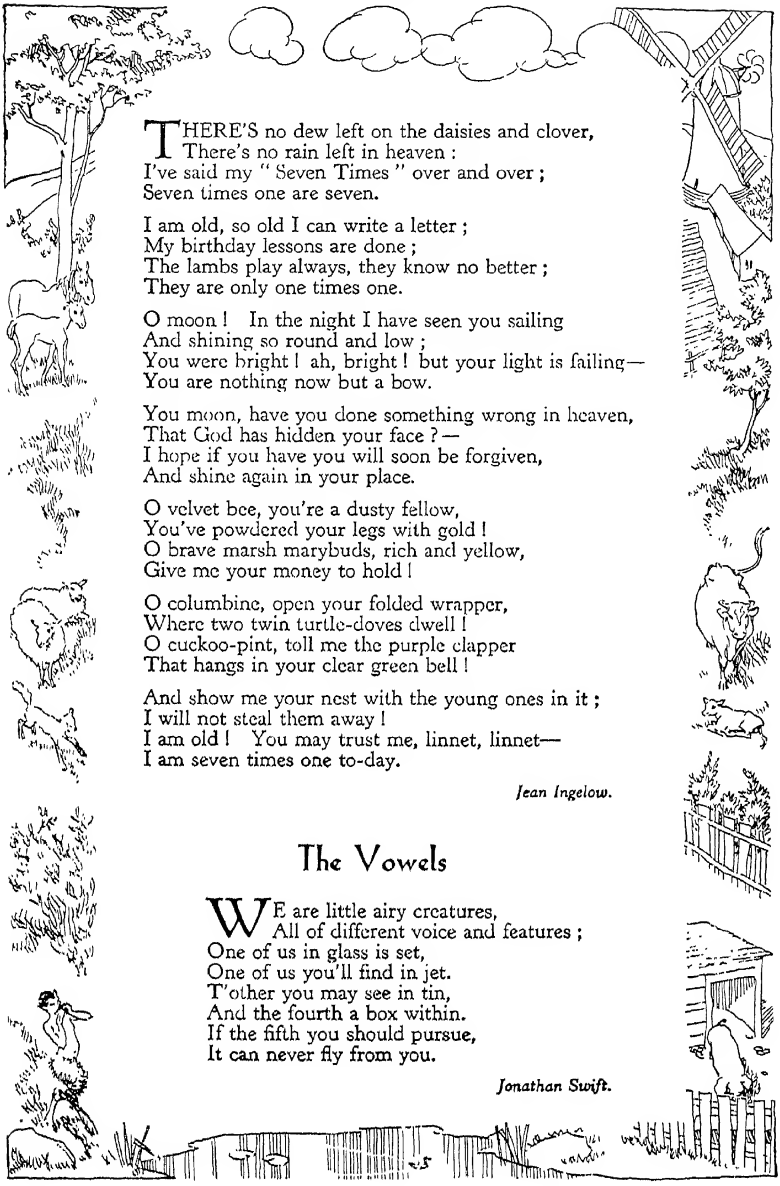
Stately Spanish galleon coming from the Isthmus,
Dipping through the Tropics by the palm-green shores
With a cargo of diamonds,
Emeralds, amethysts,
Topazes, and cinnamon and gold moidores.

Dirty British coaster with a salt-caked smoke-stack,
Butting through the Channel in the mad March days,
With a cargo of Tyne coal,
Road-rail, pig-lead,
Firewood, ironware and cheap tin trays.

John Masefield.



Seven Years Old



THERE'S no dew left on the daisies and clover,
There's no rain left in heaven :
I've said my "Seven Times" over and over ;
Seven times one are seven.

I am old, so old I can write a letter ;
My birthday lessons are done ;
The lambs play always, they know no better ;
They are only one times one.

O moon ! In the night I have seen you sailing
And shining so round and low ;
You were bright ! ah, bright ! but your light is failing—
You are nothing now but a bow.

You moon, have you done something wrong in heaven,
That God has hidden your face ?—
I hope if you have you will soon be forgiven,
And shine again in your place.

O velvet bee, you're a dusty fellow,
You've powdered your legs with gold !
O brave marsh marybuds, rich and yellow,
Give me your money to hold !

O columbine, open your folded wrapper,
Where two twin turtle-doves dwell !
O cuckoo-pint, toll me the purple clapper
That hangs in your clear green bell !

And show me your nest with the young ones in it ;
I will not steal them away !
I am old ! You may trust me, linnet, linnet—
I am seven times one to-day.

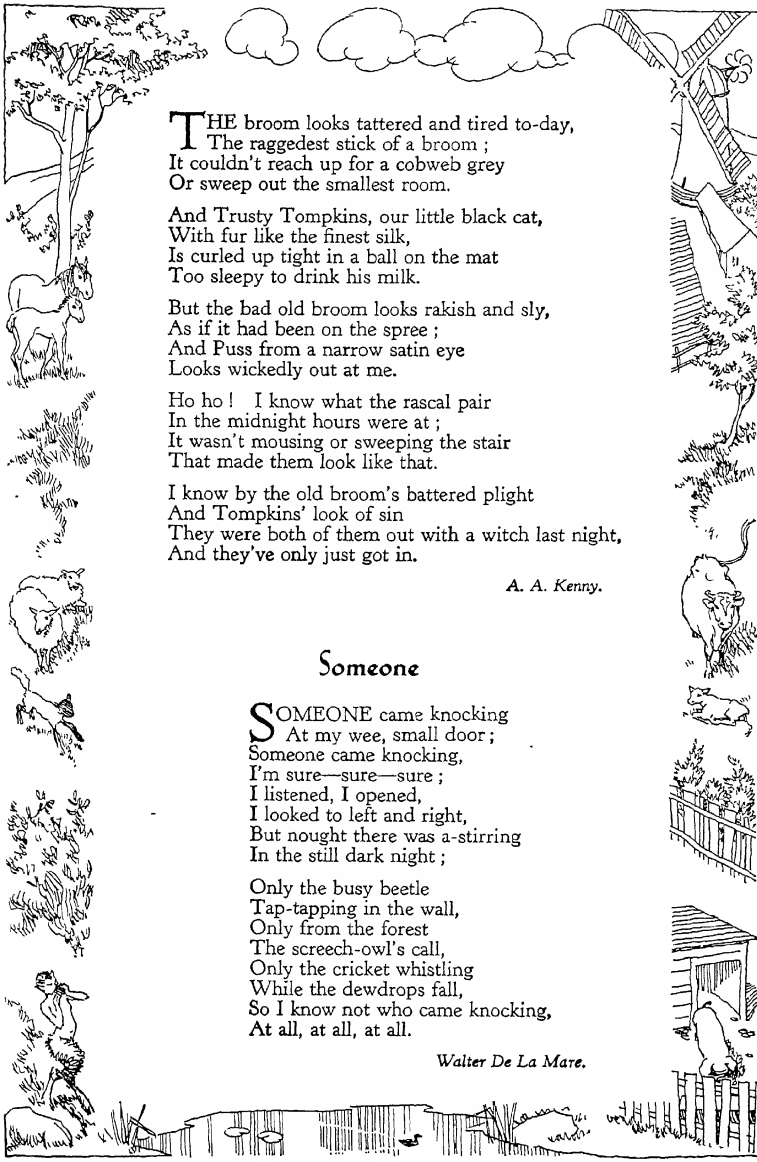
Jean Ingelow.

The Vowels

WE are little airy creatures,
All of different voice and features ;
One of us in glass is set,
One of us you'll find in jet.
T'other you may see in tin,
And the fourth a box within.
If the fifth you should pursue,
It can never fly from you.

Jonathan Swift.

The Cat and the Broom



THE broom looks tattered and tired to-day,
The raggedest stick of a broom ;
It couldn't reach up for a cobweb grey
Or sweep out the smallest room.

And Trusty Tompkins, our little black cat,
With fur like the finest silk,
Is curled up tight in a ball on the mat
Too sleepy to drink his milk.

But the bad old broom looks rakish and sly,
As if it had been on the spree ;
And Puss from a narrow satin eye
Looks wickedly out at me.

Ho ho ! I know what the rascal pair
In the midnight hours were at ;
It wasn't mousing or sweeping the stair
That made them look like that.

I know by the old broom's battered plight
And Tompkins' look of sin
They were both of them out with a witch last night,
And they've only just got in.

A. A. Kenny.

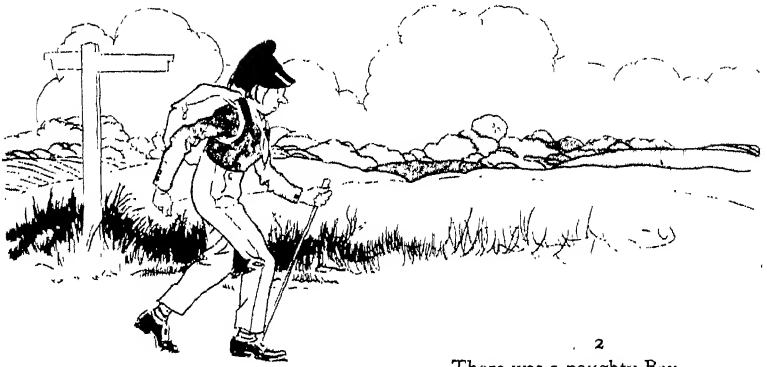
Someone

SOMEONE came knocking
At my wee, small door ;
Someone came knocking,
I'm sure—sure—sure ;
I listened, I opened,
I looked to left and right,
But nought there was a-stirring
In the still dark night ;

Only the busy beetle
Tap-tapping in the wall,
Only from the forest
The screech-owl's call,
Only the cricket whistling
While the dewdrops fall,
So I know not who came knocking,
At all, at all, at all.

Walter De La Mare.

The Naughty Boy



1

THERE was a naughty Boy,
A naughty Boy was he,
He would not stop at home,
He could not quiet be—
He took
In his Knapsack
A Book
Full of vowels
And a shirt
With some towels—
A slight cap
For night-cap—
A hair brush,
Comb ditto,
New stockings,
For old ones
Would split O!
This knapsack
Tight at's back
He rivetted close
And followed his Nose,
To the North,
To the North,
And followed his nose
To the North.

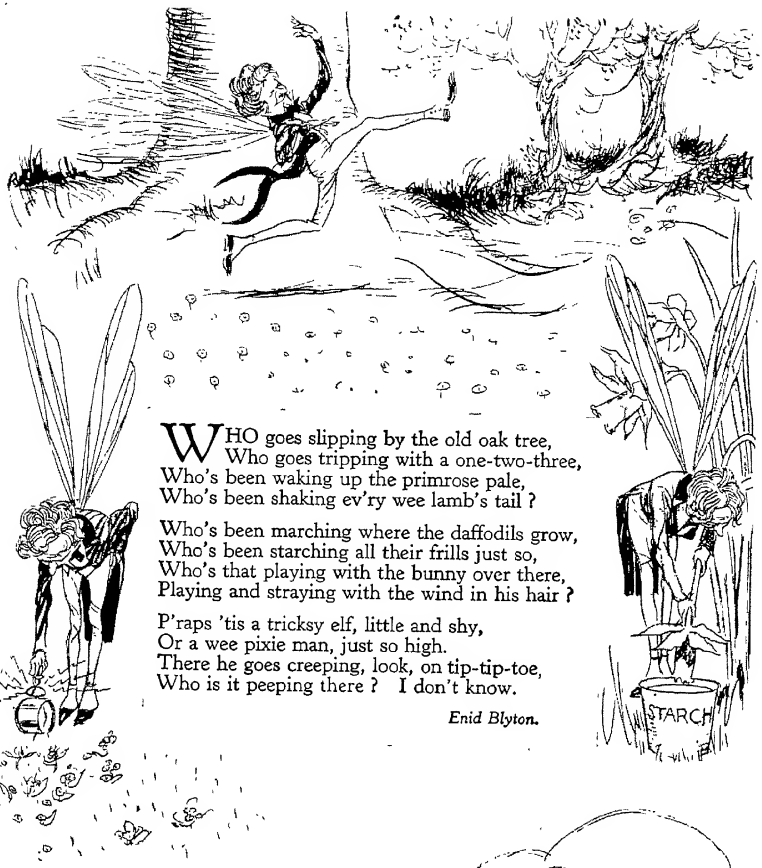
2

There was a naughty Boy,
And a naughty Boy was he,
He ran away to Scotland
The people for to see—
Then he found
That the ground
Was as hard,
That a yard,
Was as long,
That a song
Was as merry,
That a cherry
Was as red—
That lead
Was as weighty,
That fourscore
Was as eighty,
That a door
Was as wooden
As in England—
So he stood in his shoes
And he wonder'd,
He wonder'd,
He stood in his shoes
And he wonder'd.

John Keats



Who Is It?

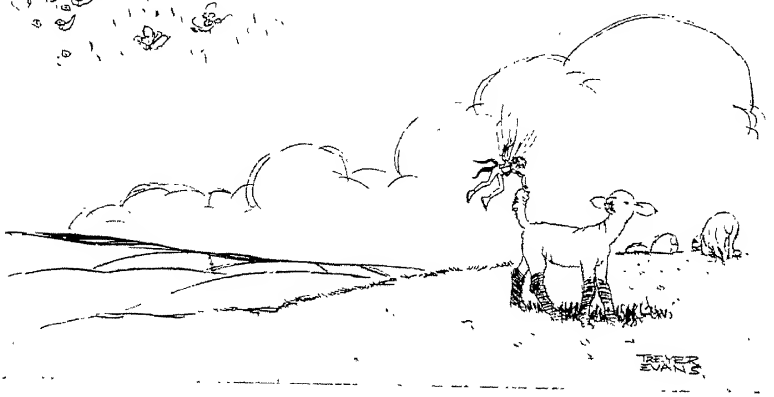


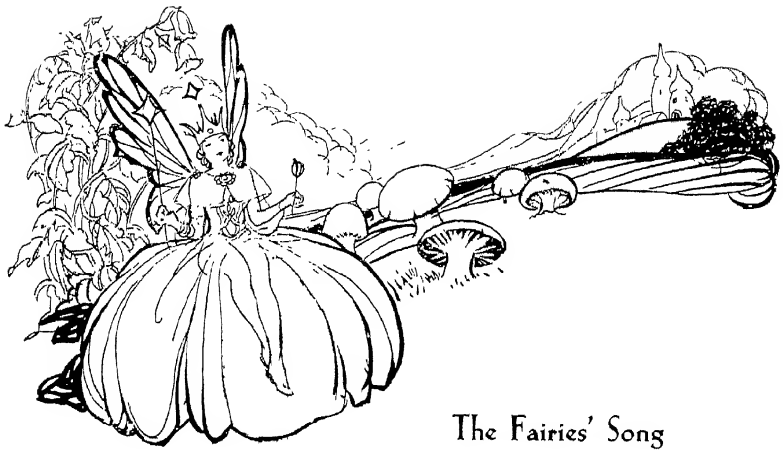
WHO goes slipping by the old oak tree,
Who goes tripping with a one-two-three,
Who's been waking up the primrose pale,
Who's been shaking ev'ry wee lamb's tail?

Who's been marching where the daffodils grow,
Who's been starching all their frills just so,
Who's that playing with the bunny over there,
Playing and straying with the wind in his hair?

P'raps 'tis a tricksy elf, little and shy,
Or a wee pixie man, just so high.
There he goes creeping, look, on tip-tip-toe,
Who is it peeping there? I don't know.

Enid Blyton.





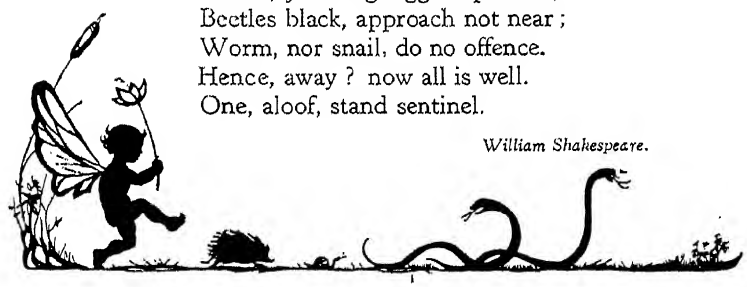
The Fairies' Song

YOU spotted snakes with double tongue,
Thorny hedge-hogs, be not seen ;
Newts, and blind-worms, do no wrong ;
Come not near our fairy queen.

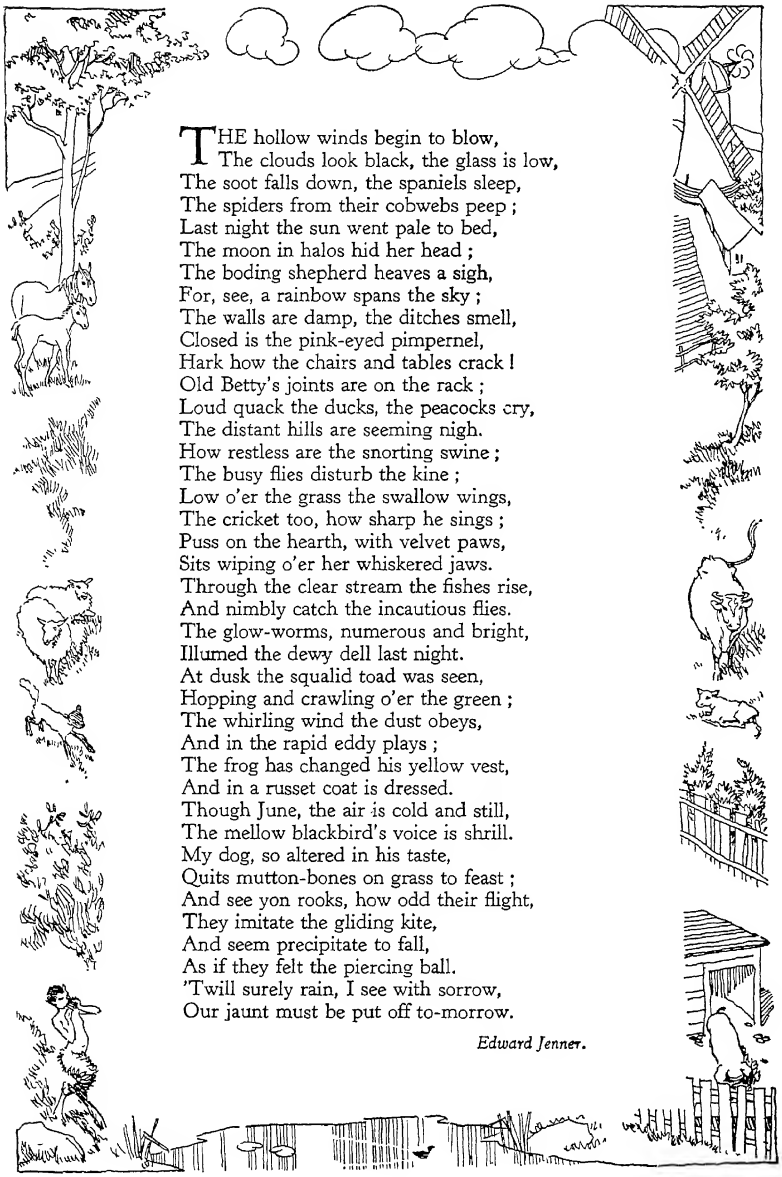
Philomel, with melody,
Sing in our sweet lullaby ;
Lulla, lulla, lullaby ; lulla, lulla, lullaby ;
Never harm, nor spell, nor charm,
Come our lovely lady nigh ;
So, good night, with lullaby.

Weaving spiders come not here ;
Hence, you long-legged spinners, hence!
Beetles black, approach not near ;
Worm, nor snail, do no offence.
Hence, away ? now all is well.
One, aloof, stand sentinel.

William Shakespeare.



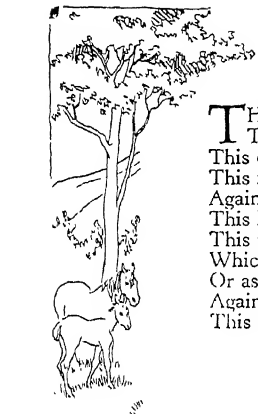
Signs of Rain



THE hollow winds begin to blow,
The clouds look black, the glass is low,
The soot falls down, the spaniels sleep,
The spiders from their cobwebs peep;
Last night the sun went pale to bed,
The moon in halos hid her head;
The boding shepherd heaves a sigh,
For, see, a rainbow spans the sky;
The walls are damp, the ditches smell,
Closed is the pink-eyed pimpernel,
Hark how the chairs and tables crack!
Old Betty's joints are on the rack;
Loud quack the ducks, the peacocks cry,
The distant hills are seeming nigh.
How restless are the snorting swine;
The busy flies disturb the kine;
Low o'er the grass the swallow wings,
The cricket too, how sharp he sings;
Puss on the hearth, with velvet paws,
Sits wiping o'er her whiskered jaws.
Through the clear stream the fishes rise,
And nimbly catch the incautious flies.
The glow-worms, numerous and bright,
Illumed the dewy dell last night.
At dusk the squalid toad was seen,
Hopping and crawling o'er the green;
The whirling wind the dust obeys,
And in the rapid eddy plays;
The frog has changed his yellow vest,
And in a russet coat is dressed.
Though June, the air is cold and still,
The mellow blackbird's voice is shrill.
My dog, so altered in his taste,
Quits mutton-bones on grass to feast;
And see yon rooks, how odd their flight,
They imitate the gliding kite,
And seem precipitate to fall,
As if they felt the piercing ball.
'Twill surely rain, I see with sorrow,
Our jaunt must be put off to-morrow.

Edward Jenner.

England



THIS royal throne of kings, this scepter'd isle,
This earth of majesty, this seat of Mars,
This other Eden, demi-paradise,
This fortress built by Nature for herself
Against infection and the hand of war,
This happy breed of men, this little world,
This precious stone set in the silver sea,
Which serves it in the office of a wall
Or as a moat defensive to a house,
Against the envy of less happier lands,
This blessed plot, this earth, this realm, this England.

William Shakespeare.

To the Lady-bird

LADY-BIRD! Lady-bird! fly away home;
The field-mouse is gone to her nest,
The daisies have shut up their sweet sleepy eyes,
And the bees and the birds are at rest.

Lady-bird! Lady-bird! fly away home;
The glow-worm is lighting her lamp,
The dew's falling fast, and your fine speckled wings
Will be wet with the close-clinging damp.

Lady-bird! Lady-bird! fly away home;
The fairy-bells tinkle afar;
Make haste, or they'll catch you, and harness you fast,
With a cobweb to Oberon's car.

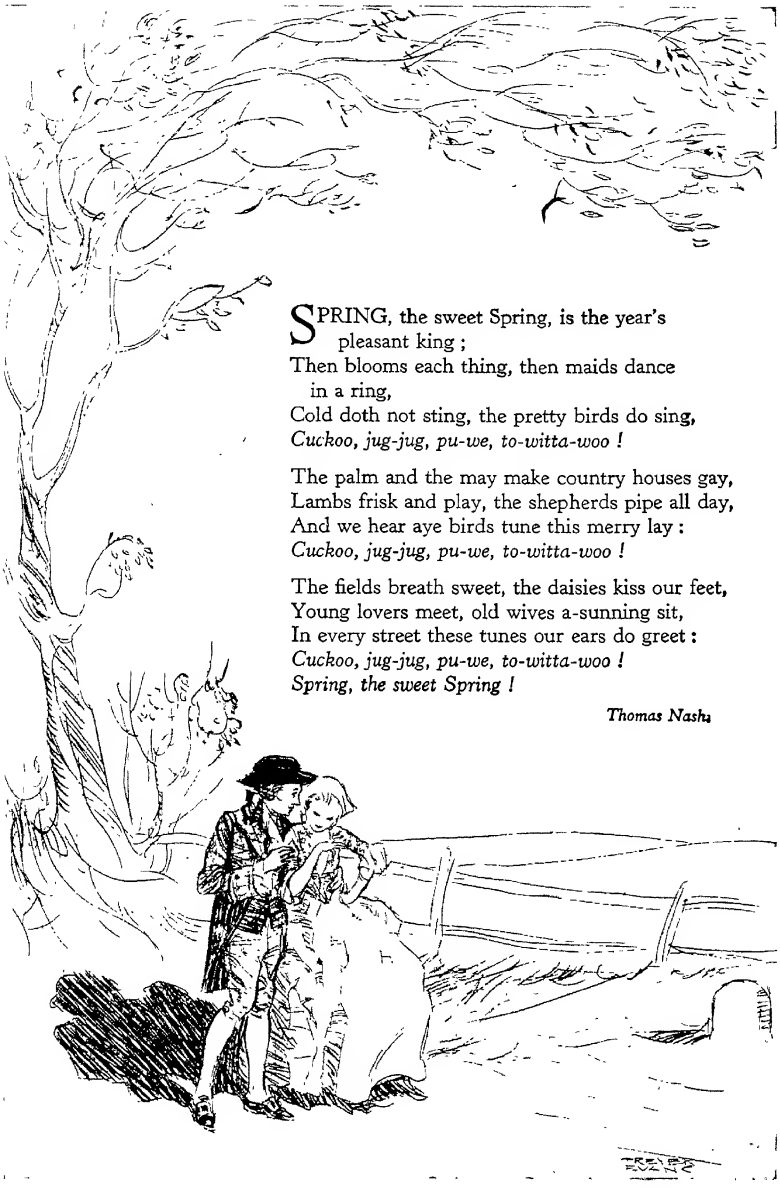
Anon.

The Thrush's Nest

WITHIN a thick and spreading hawthorn bush
That overhung a molehill large and round,
I heard from morn to morn a merry thrush
Sing hymns to sunrise, and I drank the sound
With joy; and often, an intruding guest,
I watched her secret toil from day to day—
How true she warped the moss, to form a nest,
And modelled it within with wood and clay;
And by and by, like heath bells gilt with dew,
There lay her shining eggs, as bright as flowers,
Ink-spotted over shells of greeny blue;
And there I witnessed in the sunny hours,
A brood of Nature's minstrels chirp and fly,
Glad as the sunshine and the laughing sky.

John Clare.

Spring



SPRING, the sweet Spring, is the year's
pleasant king ;
Then blooms each thing, then maids dance
in a ring,
Cold doth not sting, the pretty birds do sing,
Cuckoo, jug-jug, pu-we, to-witta-woo !

The palm and the may make country houses gay,
Lambs frisk and play, the shepherds pipe all day,
And we hear aye birds tune this merry lay :
Cuckoo, jug-jug, pu-we, to-witta-woo !

The fields breath sweet, the daisies kiss our feet,
Young lovers meet, old wives a-sunning sit,
In every street these tunes our ears do greet :
Cuckoo, jug-jug, pu-we, to-witta-woo !
Spring, the sweet Spring !

Thomas Nash

Crab-Apple

I DREAMED the Fairies wanted me
To spend my birth-night with them all;
And I said, "Oh, but you're so wee
And I am so tremendous tall,
What could we do?"
"Crab-apple stem!"
Said they, and I was just like them.

And then, when we were all the same,
The party and the fun began;
They said they'd teach me a new game
Of "Dew Ponds." "I don't think I can
Play that," I said.
"Crab-apple blue!"
Said they, and I could play too.

And then, when we had played and played,
The Fairies said that we would dance;
And I said, "Oh, but I'm afraid
That I've no shoes." I gave a glance
At my bare toes.
"Crab-apple sweet!"
Said they, and shoes were on my feet.

And then we danced away, away,
Until my birth-night all was done;
And I said, "I'll go home to-day;
And thank you for my lovely fun,
I'll come again."
"Crab-apple red!"
Said they, and I woke up in bed.

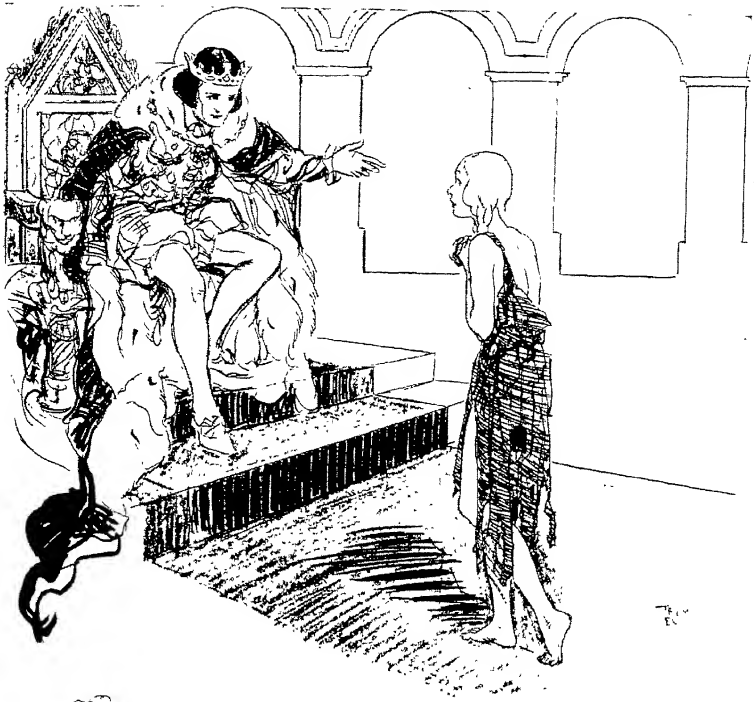
Ethel Talbot.

The Dove

I HAD a dove and the sweet dove died;
And I have thought it died of grieving:
O, what could it grieve for? Its feet were tied,
With a silken thread of my own hands' weaving;
Sweet little red feet! Why should you die—
Why should you leave me, sweet bird! why?
You liv'd alone in the forest tree,
Why, pretty thing! would you not live with me?
I kiss'd you oft, and gave you white peas;
Why not live sweetly, as in the green trees?

John Keats.

The Beggar Maid





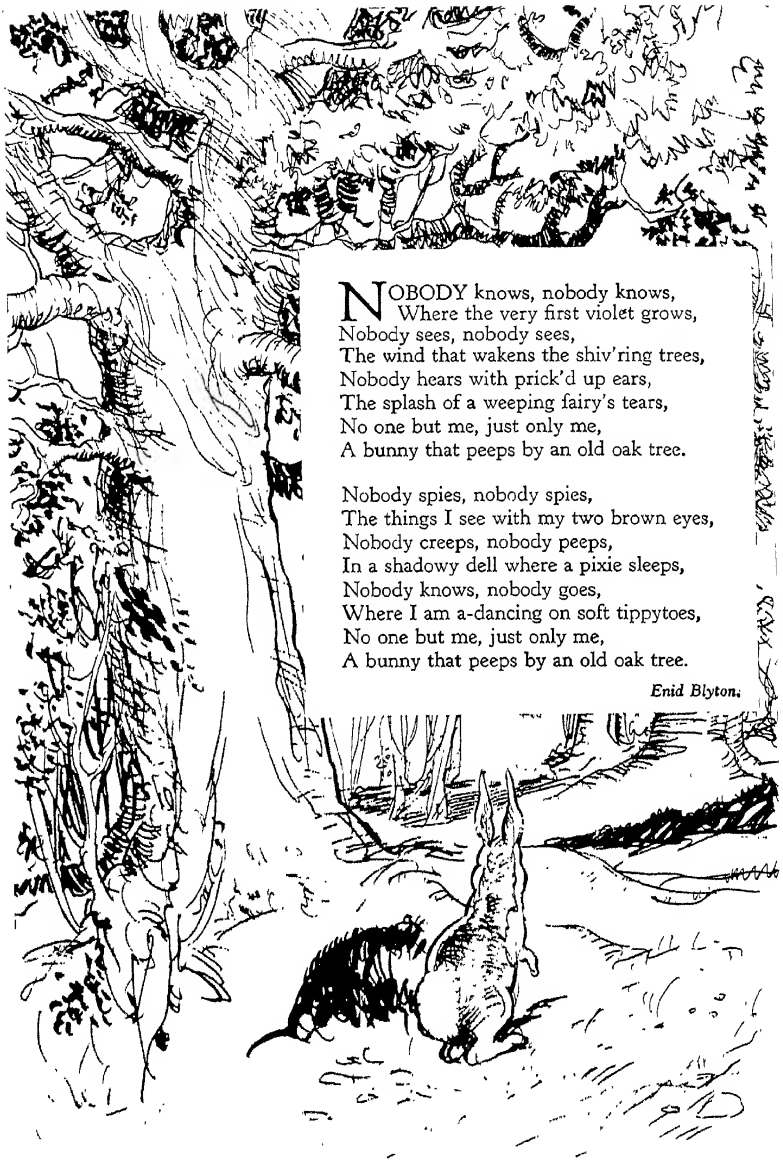
HER arms across her breast she laid,
She was more fair than words can say:
Bare-footed came the beggar maid
Before the king Cophetua.
In robe and crown the king stept down,
To meet and greet her on her way;
"It is no wonder," said the lords,
"She is more beautiful than day."

As shines the moon in clouded skies,
She in her poor attire was seen:
One praised her ankles, one her eyes,
One her dark hair and lovesome mien.
So sweet a face, such angel grace,
In all that land had never been:
Cophetua sware a royal oath:
"This beggar maid shall be my queen!"

Tennyson.



Rabbit-Song



NOBODY knows, nobody knows,
Where the very first violet grows,
Nobody sees, nobody sees,
The wind that wakens the shiv'ring trees,
Nobody hears with prick'd up ears,
The splash of a weeping fairy's tears,
No one but me, just only me,
A bunny that peeps by an old oak tree.

Nobody spies, nobody spies,
The things I see with my two brown eyes,
Nobody creeps, nobody peeps,
In a shadowy dell where a pixie sleeps,
Nobody knows, nobody goes,
Where I am a-dancing on soft tippytoes,
No one but me, just only me,
A bunny that peeps by an old oak tree.

Enid Blyton.

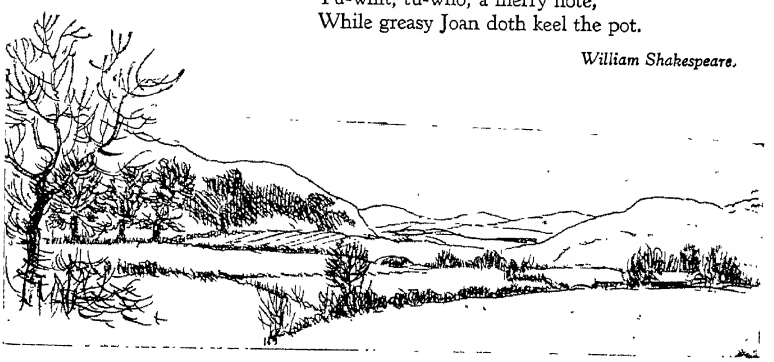




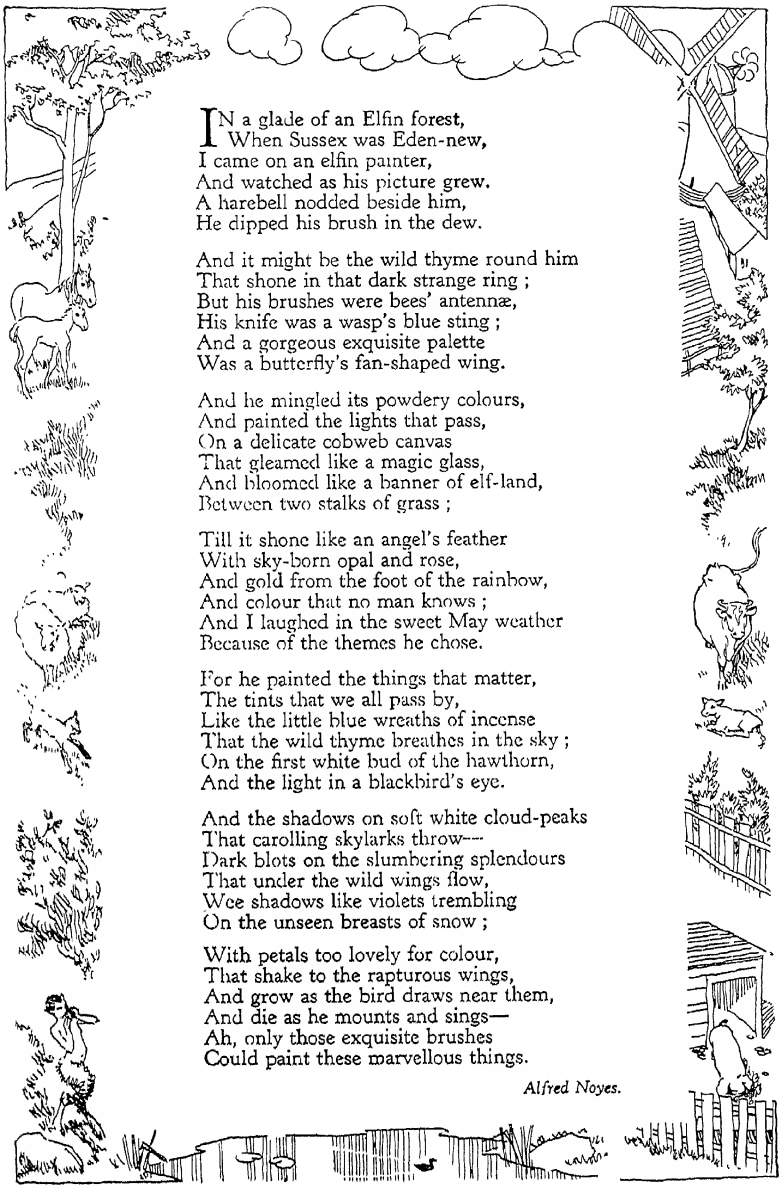
WHEN icicles hang by the wall,
And Dick the shepherd blows his nail,
And Tom bears logs into the hall,
And milk comes frozen home in pail,
When blood is nipp'd, and ways be foul,
Then nightly sings the staring owl,
Tu-who ;
Tu-whit, tu-who, a merry note,
While greasy Joan doth keel the pot.

When all around the wind doth blow,
And coughing drowns the parson's saw,
And birds sit brooding in the snow,
And Marion's nose looks red and raw,
When roasted crabs hiss in the bowl,
When nightly sings the staring owl,
Tu-who ;
Tu-whit, tu-who, a merry note,
While greasy Joan doth keel the pot.

William Shakespeare.



The Elfin Artist



IN a glade of an Elfin forest,
When Sussex was Eden-new,
I came on an elfin painter,
And watched as his picture grew.
A harebell nodded beside him,
He dipped his brush in the dew.

And it might be the wild thyme round him
That shone in that dark strange ring ;
But his brushes were bees' antennæ,
His knife was a wasp's blue sting ;
And a gorgeous exquisite palette
Was a butterfly's fan-shaped wing.

And he mingled its powdery colours,
And painted the lights that pass,
On a delicate cobweb canvas
That gleamed like a magic glass,
And bloomed like a banner of elf-land,
Between two stalks of grass ;

Till it shone like an angel's feather
With sky-born opal and rose,
And gold from the foot of the rainbow,
And colour that no man knows ;
And I laughed in the sweet May weather
Because of the themes he chose.

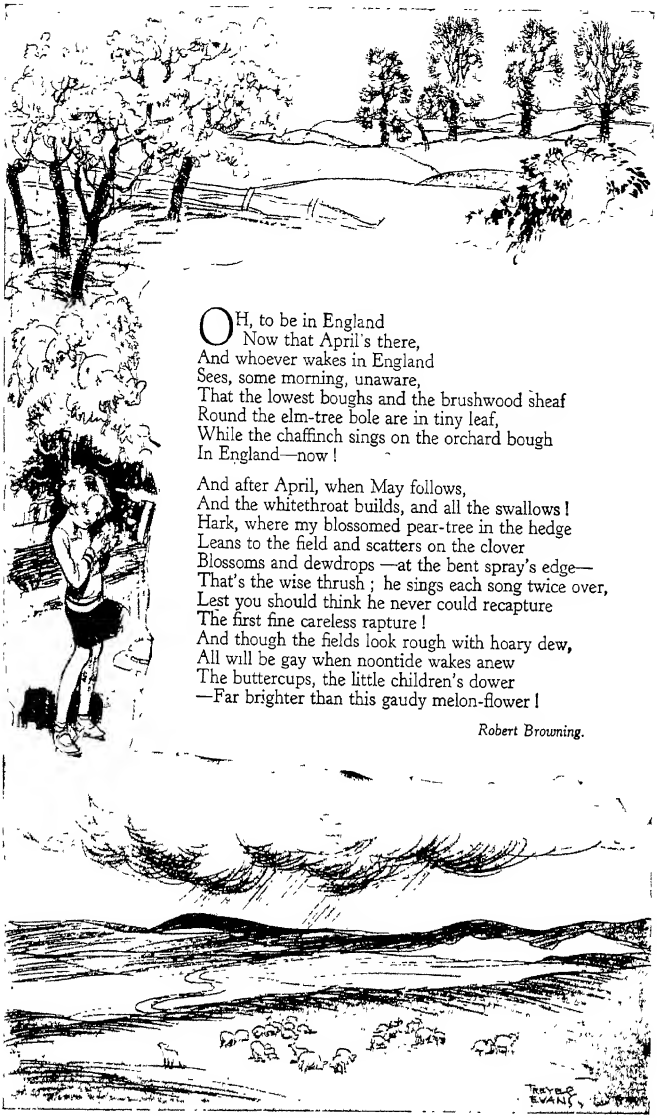
For he painted the things that matter,
The tints that we all pass by,
Like the little blue wreaths of incense
That the wild thyme breathes in the sky ;
On the first white bud of the hawthorn,
And the light in a blackbird's eye.

And the shadows on soft white cloud-peaks
That carolling skylarks throw—
Dark blots on the slumbering splendours
That under the wild wings flow,
Wee shadows like violets trembling
On the unseen breasts of snow ;

With petals too lovely for colour,
That shake to the rapturous wings,
And grow as the bird draws near them,
And die as he mounts and sings—
Ah, only those exquisite brushes
Could paint these marvellous things.

Alfred Noyes.

Home-Thoughts From Abroad

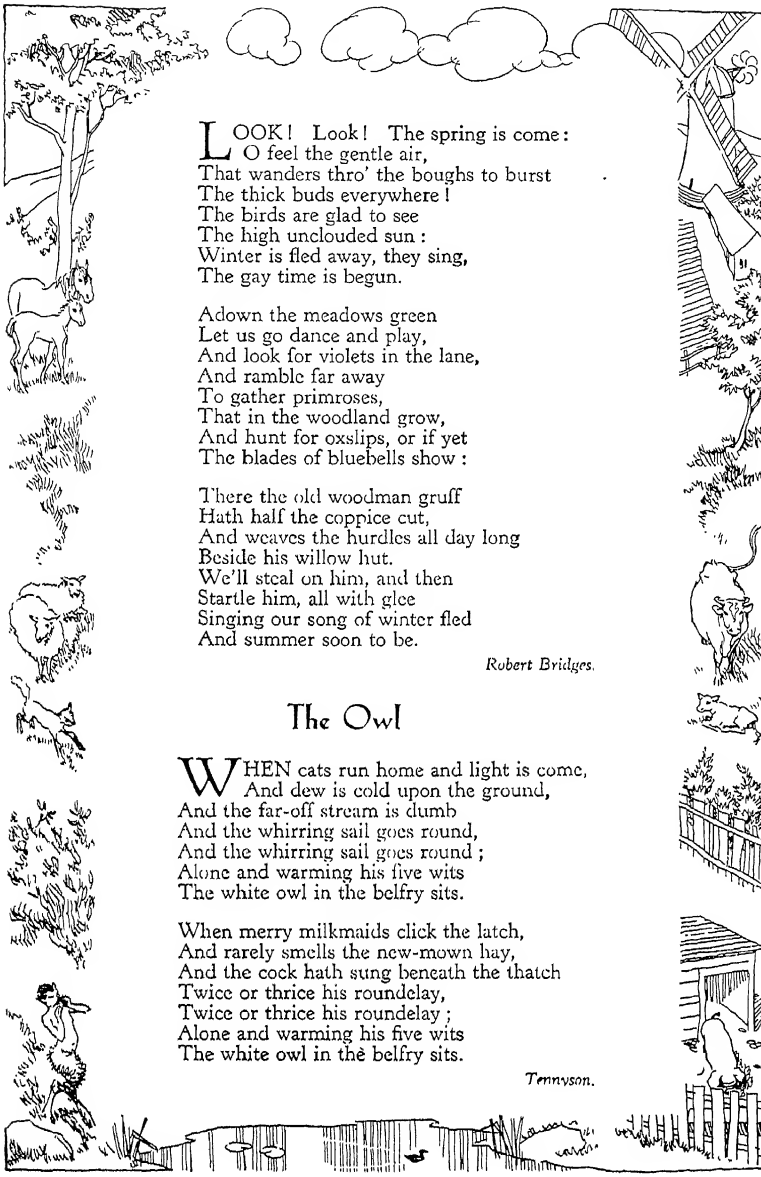


OH, to be in England
Now that April's there,
And whoever wakes in England
Sees, some morning, unaware,
That the lowest boughs and the brushwood sheaf
Round the elm-tree bole are in tiny leaf,
While the chaffinch sings on the orchard bough
In England—now!

And after April, when May follows,
And the whitethroat builds, and all the swallows!
Hark, where my blossomed pear-tree in the hedge
Leans to the field and scatters on the clover
Blossoms and dewdrops —at the bent spray's edge—
That's the wise thrush; he sings each song twice over,
Lest you should think he never could recapture
The first fine careless rapture!
And though the fields look rough with hoary dew,
All will be gay when noontide wakes anew
The buttercups, the little children's dower
—Far brighter than this gaudy melon-flower!

Robert Browning.

First Spring Morning—A Child's Poem



LOOK! Look! The spring is come:
O feel the gentle air,
That wanders thro' the boughs to burst
The thick buds everywhere!
The birds are glad to see
The high unclouded sun:
Winter is fled away, they sing,
The gay time is begun.

Adown the meadows green
Let us go dance and play,
And look for violets in the lane,
And ramble far away
To gather primroses,
That in the woodland grow,
And hunt for oxslips, or if yet
The blades of bluebells show:

There the old woodman gruff
Hath half the coppice cut,
And weaves the hurdles all day long
Beside his willow hut.
We'll steal on him, and then
Startle him, all with glee
Singing our song of winter fled
And summer soon to be.

Robert Bridges.

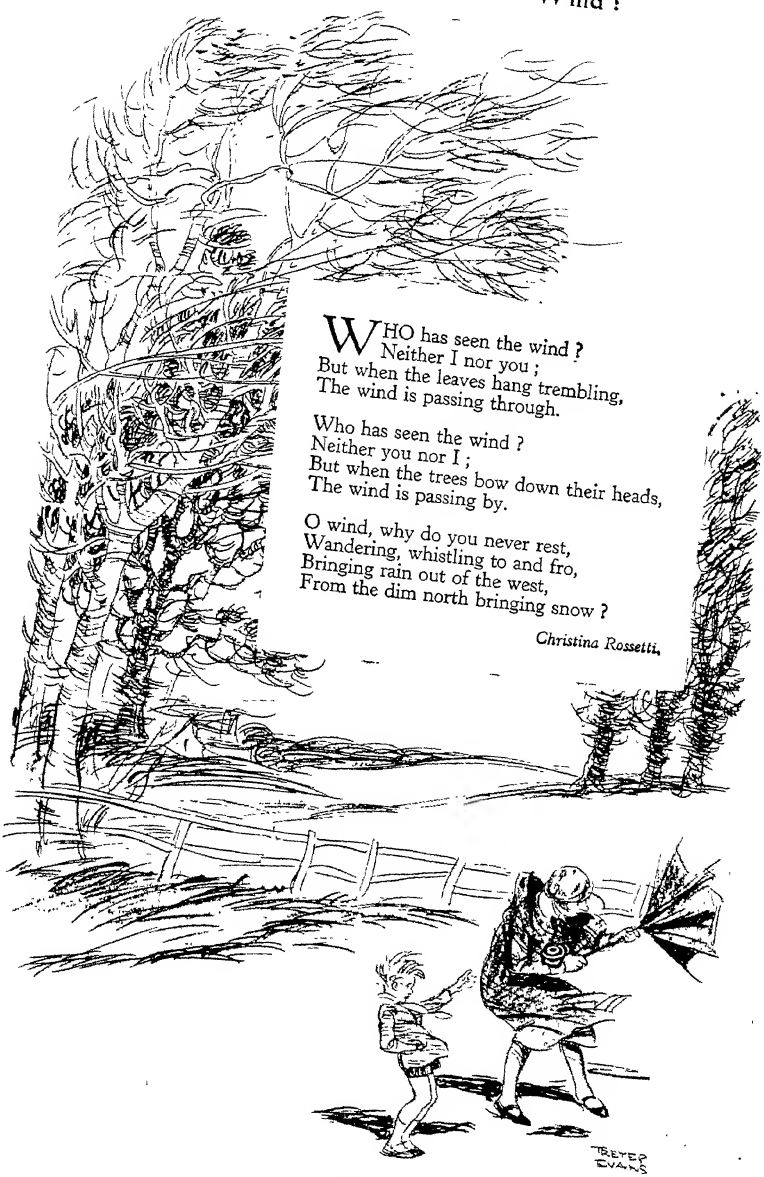
The Owl

WHEN cats run home and light is come,
And dew is cold upon the ground,
And the far-off stream is dumb
And the whirring sail goes round,
And the whirring sail goes round;
Alone and warming his five wits
The white owl in the belfry sits.

When merry milkmaids click the latch,
And rarely smells the new-mown hay,
And the cock hath sung beneath the thatch
Twice or thrice his roundelay,
Twice or thrice his roundelay;
Alone and warming his five wits
The white owl in the belfry sits.

Tennyson.

Who Has Seen the Wind?



WHO has seen the wind?
Neither I nor you;
But when the leaves hang trembling,
The wind is passing through.

Who has seen the wind?
Neither you nor I;
But when the trees bow down their heads,
The wind is passing by.

O wind, why do you never rest,
Wandering, whistling to and fro,
Bringing rain out of the west,
From the dim north bringing snow?

Christina Rossetti.

The Wind in a Frolic

THE wind one morning sprang up from sleep,
Saying, "Now for a frolic! Now for a leap!
Now for a madcap galloping chase!
I'll make a commotion in every place!"
So it swept with a bustle right through a great town,
Creaking the signs and scattering down
Shutters; and whisking, with merciless squalls,
Old women's bonnets and gingerbread stalls.
There never was heard a much lustier shout,
As the apples and oranges trundled about;
And the urchins, that stand with their thievish eyes
For ever on watch, ran off each with a prize.
Then away to the field it went blustering and humming,
And the cattle all wondered whatever was coming.
It plucked by their tails the grave matronly cows,
And tossed the colts' manes all about their brows,
Till, offended at such a familiar salute,
They all turned their backs, and stood sullenly mute.
So on it went, capering and playing its pranks;
Whistling with reeds on the broad river's banks;
Puffing the birds as they sat on the spray,
Or the traveller grave on the King's highway.
It was not too nice to hustle the bags
Of the beggar, and flutter his dirty rags;
'T was so bold that it feared not to play its joke
With the doctor's wig, or the gentleman's cloak.
Through the forest it roared, and cried gaily, "Now,
You sturdy old oaks, I'll make you bow!"
And it made them bow without more ado,
Or it cracked their great branches through and through.
Then it rushed like a monster on cottage and farm,
Striking their dwellers with sudden alarm;
And they ran out like bees in a midsummer swarm.
There were dames with their kerchiefs tied over their caps;
To see if their poultry were free from mishaps;
The turkeys they gobbled, the geese screamed aloud,
And the hens crept to roost in a terrified crowd;
There was rearing of ladders, and logs laying on
Where the thatch from the roof threatened soon to be gone.
But the wind had passed on, and had met in a lane
With a schoolboy, who panted and struggled in vain;
For it tossed him and twirled him, then passed, and he stood
With his hat in a pool and his shoe in the mud.

* * * * *

But away went the wind in its holiday glee,
And now it was far on the billowy sea,
And the lordly ships felt its staggering blow,
And the little boats darted to and fro.
But lo! it was night, and it sank to rest,
On the sea-bird's rock in the gleaming West,
Laughing to think, in its fearful fun,
How little of mischief it had done.

William Howitt.

The Lucky Ducks

THE ducks go out on rainy days,
And never wear goloshes,
And no one calls to them and says,
"Put on your mackintoshes."

They never wrap their necks about
With scarves when it is chilly,
And never take umbrellas out,
They wouldn't be so silly.

But when it rains I have to do
Exactly what I'm told,
And even put on gaiters too,
In case I catch a cold.

And with umbrella out I tramp,
In mackintosh and coat,
Goloshes to keep out the damp,
And scarf around my throat.

But though the ducks wear none of these,
And never, never will,
I haven't heard them cough or sneeze
Because they've got a chill.

And when it's raining very hard,
I wish *I* had the luck
To go splish-splashing round the yard
And be a dripping duck!

Enid Blyton.

There was an Old Woman



THERE was an old woman, as I've heard tell,
She went to market her eggs for to sell ;
She went to market all on a market day ;
And she fell asleep on the king's highway.

There came by a pedlar whose name was Stout,
He cut her petticoats all round about ;
He cut her petticoats up to her knees,
Which made the old woman to shiver and freeze.

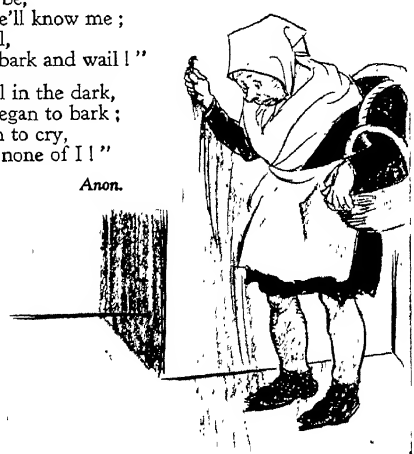
When this little woman first did wake,
She began to shiver and she began to shake.
She began to wonder and she began to cry,
" Lauk-a-mercy on me, this is none of I :

" But if it be I, as I do hope it be,
I've a little dog at home, and he'll know me ;
If it be I, he'll wag his little tail,
And if it be not I, he'll loudly bark and wail ! "

Home went the little woman all in the dark,
Up got the little dog, and he began to bark ;
He began to bark, so she began to cry,
" Lauk-a-mercy on me, this is none of I ! "

Anon.





Drake's Drum

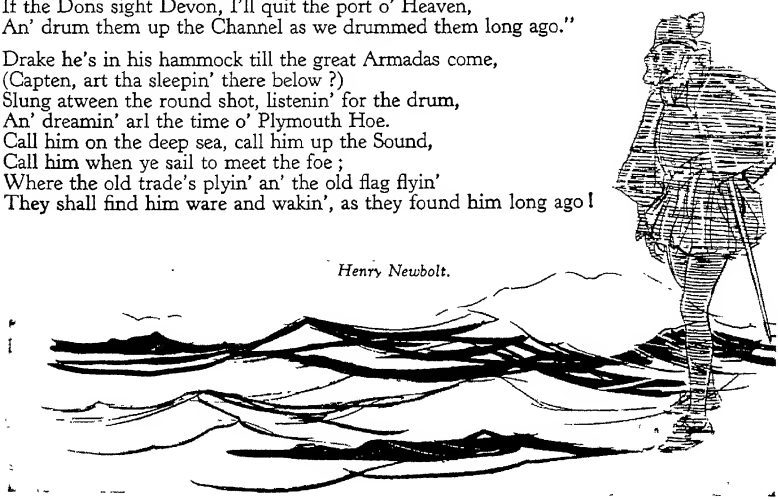


DRAKE he's in his hammock an' a thousand mile away,
(Capten, art tha sleepin' there below ?)
Slung atween the round shot in Nombre Dios Bay,
An' dreamin' arl the time o' Plymouth Hoe.
Yarnder lumes the Island, yarnder lie the ships,
Wi' sailor lads a dancin' heel-an'-toe,
An' the shore-lights flashin', an' the night-tide dashin',
He sees it arl so plainly as he saw et long ago.

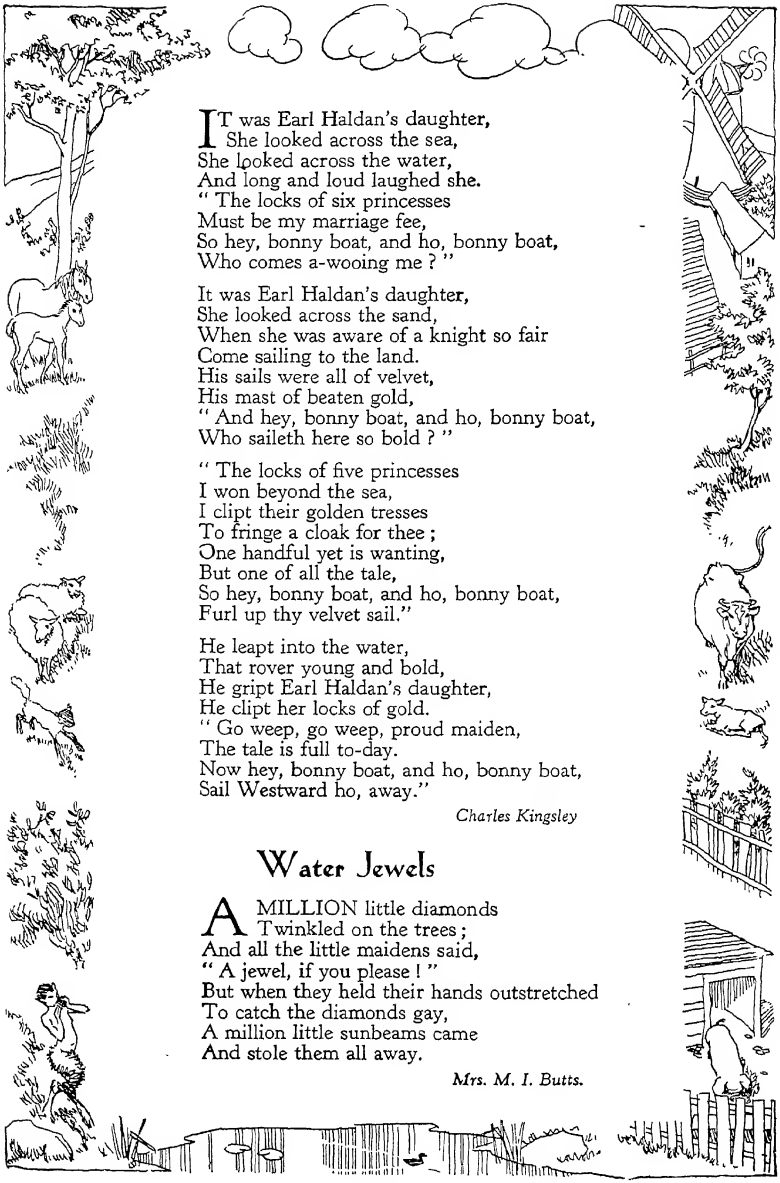
Drake he was a Devon man, an' ruled the Devon seas,
(Capten, art tha sleepin' there below ?)
Rovin' tho' his death fell, he went wi' heart at ease,
An' dreamin' arl the time o' Plymouth Hoe.
" Take my drum to England, hang et by the shore,
Strike et when your powder's runnin' low ;
If the Dons sight Devon, I'll quit the port o' Heaven,
An' drum them up the Channel as we drummed them long ago."

Drake he's in his hammock till the great Armadas come,
(Capten, art tha sleepin' there below ?)
Slung atween the round shot, listenin' for the drum,
An' dreamin' arl the time o' Plymouth Hoe.
Call him on the deep sea, call him up the Sound,
Call him when ye sail to meet the foe ;
Where the old trade's plyin' an' the old flag flyin'
They shall find him ware and wakin', as they found him long ago!

Henry Newbolt.



Earl Haldan's Daughter



IT was Earl Haldan's daughter,
She looked across the sea,
She looked across the water,
And long and loud laughed she.
"The locks of six princesses
Must be my marriage fee,
So hey, bonny boat, and ho, bonny boat,
Who comes a-wooing me?"

It was Earl Haldan's daughter,
She looked across the sand,
When she was aware of a knight so fair
Come sailing to the land.
His sails were all of velvet,
His mast of beaten gold,
"And hey, bonny boat, and ho, bonny boat,
Who saileth here so bold?"

"The locks of five princesses
I won beyond the sea,
I clipt their golden tresses
To fringe a cloak for thee;
One handful yet is wanting,
But one of all the tale,
So hey, bonny boat, and ho, bonny boat,
Furl up thy velvet sail."

He leapt into the water,
That rover young and bold,
He gript Earl Haldan's daughter,
He clipt her locks of gold.
"Go weep, go weep, proud maiden,
The tale is full to-day.
Now hey, bonny boat, and ho, bonny boat,
Sail Westward ho, away."

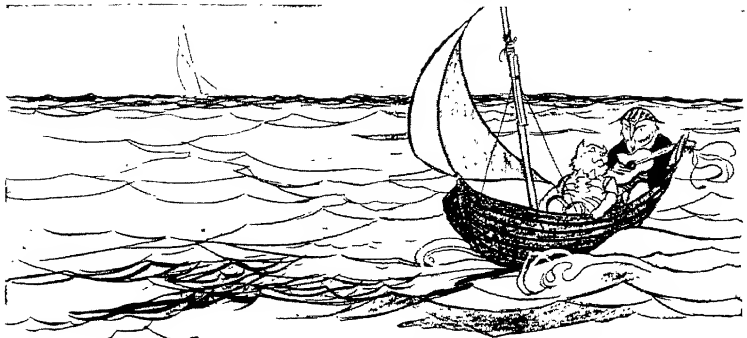
Charles Kingsley

Water Jewels

A MILLION little diamonds
Twinkled on the trees;
And all the little maidens said,
"A jewel, if you please!"
But when they held their hands outstretched
To catch the diamonds gay,
A million little sunbeams came
And stole them all away.

Mrs. M. I. Butts.

The Owl and the Pussy-Cat



THE Owl and the Pussy-Cat went to sea
In a beautiful pea-green boat ;
They took some honey, and plenty of money
Wrapped up in a five-pound note.
The Owl looked up to the moon above,
And sang to a small guitar :
" O lovely Pussy ! O Pussy, my love !
What a beautiful Pussy you are—
You are,
What a beautiful Pussy you are ! "

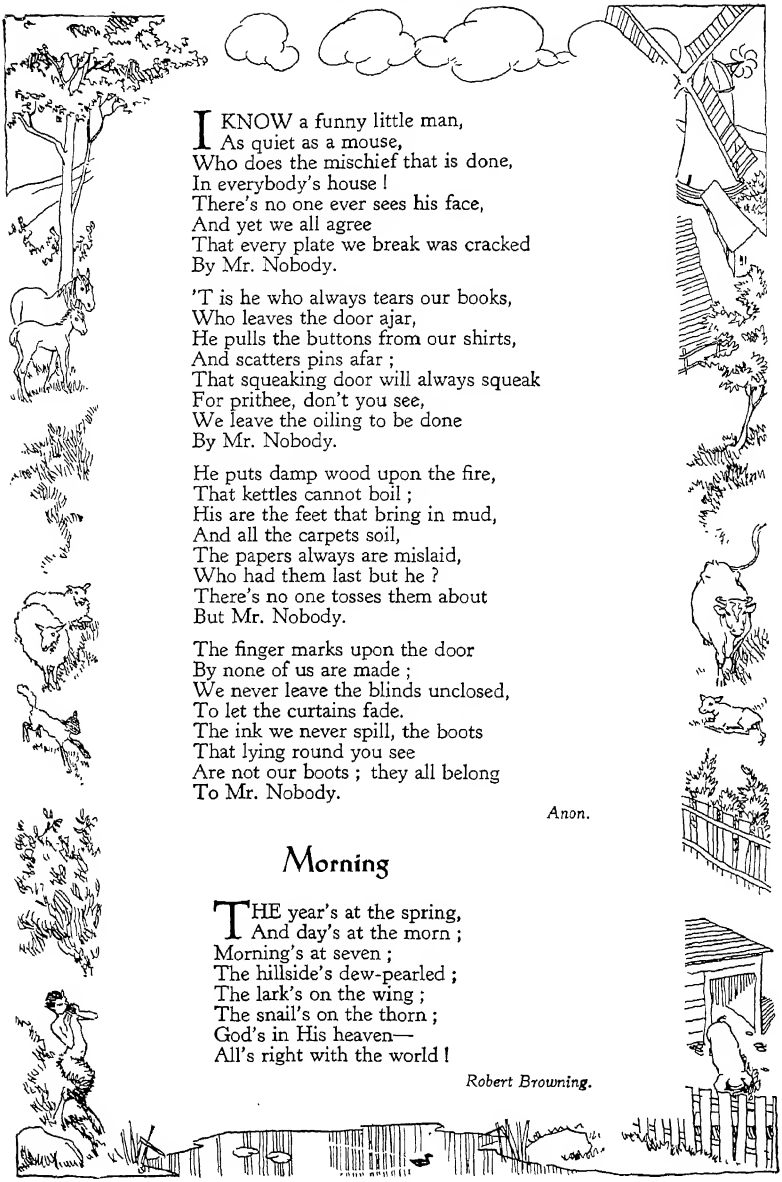


Pussy said to the Owl : " You elegant fowl !
How charmingly sweet you sing !
O let us be married—too long we have tarried—
But what shall we do for a ring ? "
They sailed away for a year and a day
To the land where the Bong-tree grows,
And there in a wood, a Piggy-wig stood
With a ring in the end of his nose—
His nose,
With a ring in the end of his nose.

" Dear Pig, are you willing to sell for one shilling
Your ring ? " Said the Piggy, " I will."
So they took it away, and were married next day
By the turkey who lives on the hill.
They dined upon mince and slices of quince,
Which they ate with a runcible spoon,
And hand in hand on the edge of the sand
They danced by the light of the moon—
The moon,
They danced by the light of the moon.

Edward Lear.

Mr. Nobody



I KNOW a funny little man,
As quiet as a mouse,
Who does the mischief that is done,
In everybody's house!
There's no one ever sees his face,
And yet we all agree
That every plate we break was cracked
By Mr. Nobody.

'T is he who always tears our books,
Who leaves the door ajar,
He pulls the buttons from our shirts,
And scatters pins afar;
That squeaking door will always squeak
For prithee, don't you see,
We leave the oiling to be done
By Mr. Nobody.

He puts damp wood upon the fire,
That kettles cannot boil;
His are the feet that bring in mud,
And all the carpets soil,
The papers always are mislaid,
Who had them last but he?
There's no one tosses them about
But Mr. Nobody.

The finger marks upon the door
By none of us are made;
We never leave the blinds unclosed,
To let the curtains fade.
The ink we never spill, the boots
That lying round you see
Are not our boots; they all belong
To Mr. Nobody.

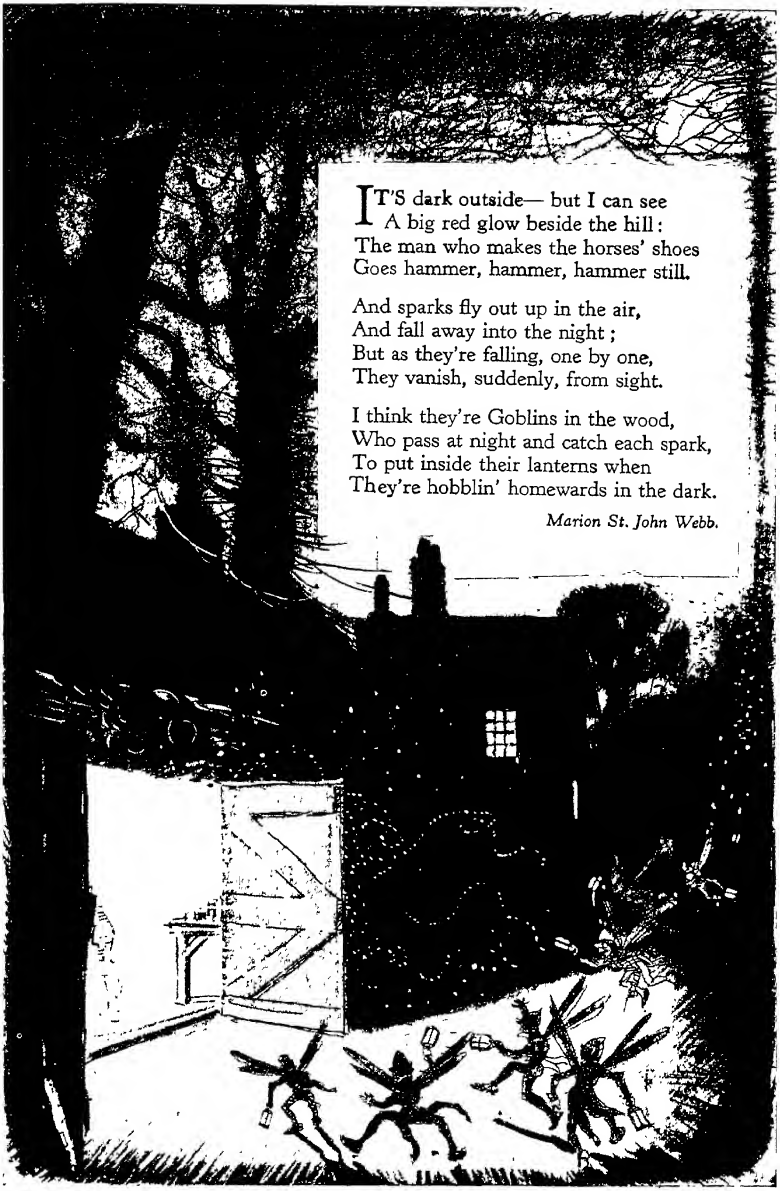
Anon.

Morning

THE year's at the spring,
And day's at the morn;
Morning's at seven;
The hillside's dew-pearled;
The lark's on the wing;
The snail's on the thorn;
God's in His heaven—
All's right with the world!

Robert Browning.

Goblins' Lanterns



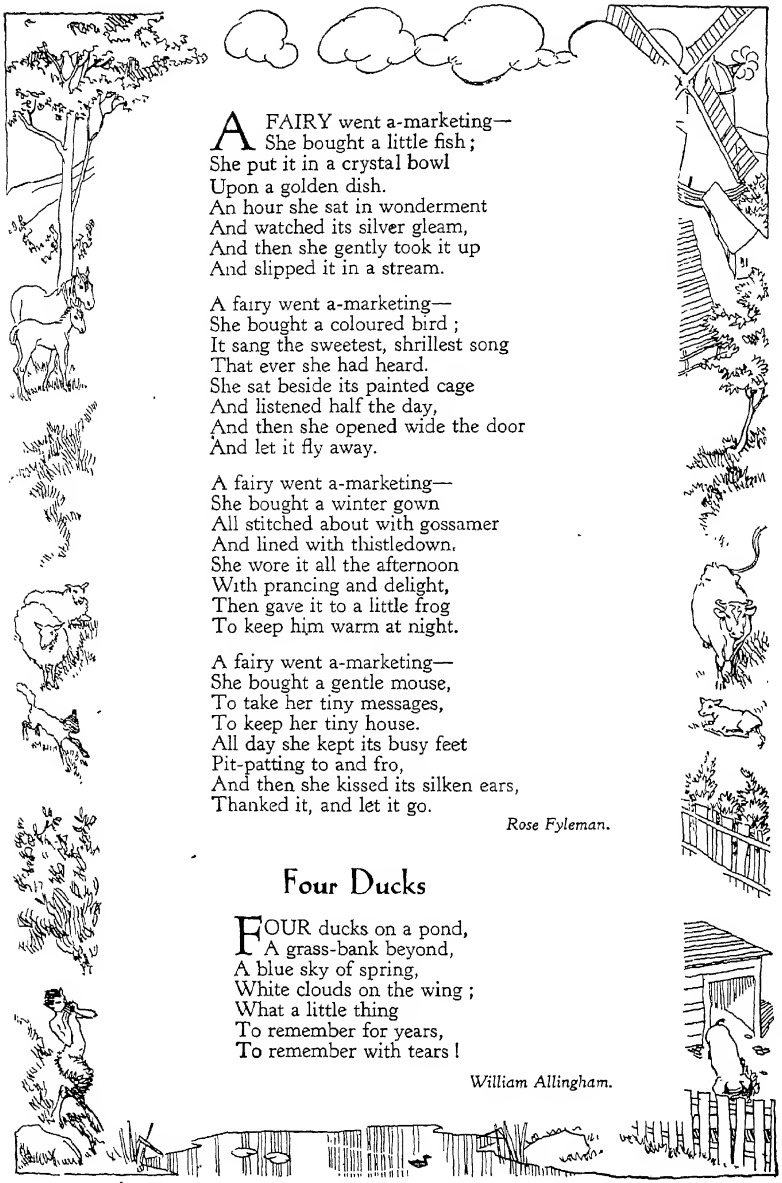
IT'S dark outside— but I can see
A big red glow beside the hill:
The man who makes the horses' shoes
Goes hammer, hammer, hammer still.

And sparks fly out up in the air,
And fall away into the night;
But as they're falling, one by one,
They vanish, suddenly, from sight.

I think they're Goblins in the wood,
Who pass at night and catch each spark,
To put inside their lanterns when
They're hobblin' homewards in the dark.

Marion St. John Webb.

A Fairy Went A-Marketing



A FAIRY went a-marketing—
She bought a little fish;
She put it in a crystal bowl
Upon a golden dish.
An hour she sat in wonderment
And watched its silver gleam,
And then she gently took it up
And slipped it in a stream.

A fairy went a-marketing—
She bought a coloured bird;
It sang the sweetest, shrillest song
That ever she had heard.
She sat beside its painted cage
And listened half the day,
And then she opened wide the door
And let it fly away.

A fairy went a-marketing—
She bought a winter gown
All stitched about with gossamer
And lined with thistledown.
She wore it all the afternoon
With prancing and delight,
Then gave it to a little frog
To keep him warm at night.

A fairy went a-marketing—
She bought a gentle mouse,
To take her tiny messages,
To keep her tiny house.
All day she kept its busy feet
Pit-patting to and fro,
And then she kissed its silken ears,
Thanked it, and let it go.

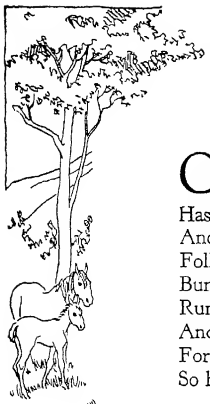
Rose Fyleman.

Four Ducks

FOUR ducks on a pond,
A grass-bank beyond,
A blue sky of spring,
White clouds on the wing;
What a little thing
To remember for years,
To remember with tears!

William Allingham.

The First Wild Rose



OYEZ, oyez, there is news to-day!
Come, you folk of the woodland way,
Hasten, folk of the velvet toes,
And see the birth of the first wild rose.
Follow me soft between the trees,
Bunnies and butterflies, birds and bees.
Run, little dormouse, bring your mate,
And tell the squirrel I may not wait.
For the kiss of the sun will wake the rose,
So hasten, Wings and Velvety Toes.

Low on the hedge she lies asleep.
Come, you bunnies, and softly peep!
Fly, you butterflies hovering near
And kiss the sweetest rose of the year.
Palest pink will her petals be
When from the bud they are shaken free,
And sweet as honey her scent will come,
(Hush, little bees, too loud you hum),

. . . . .

And hush now, folk of the velvet toes,
For the sun is waking the first wild rose!

Enid Blyton.



Old Shellover

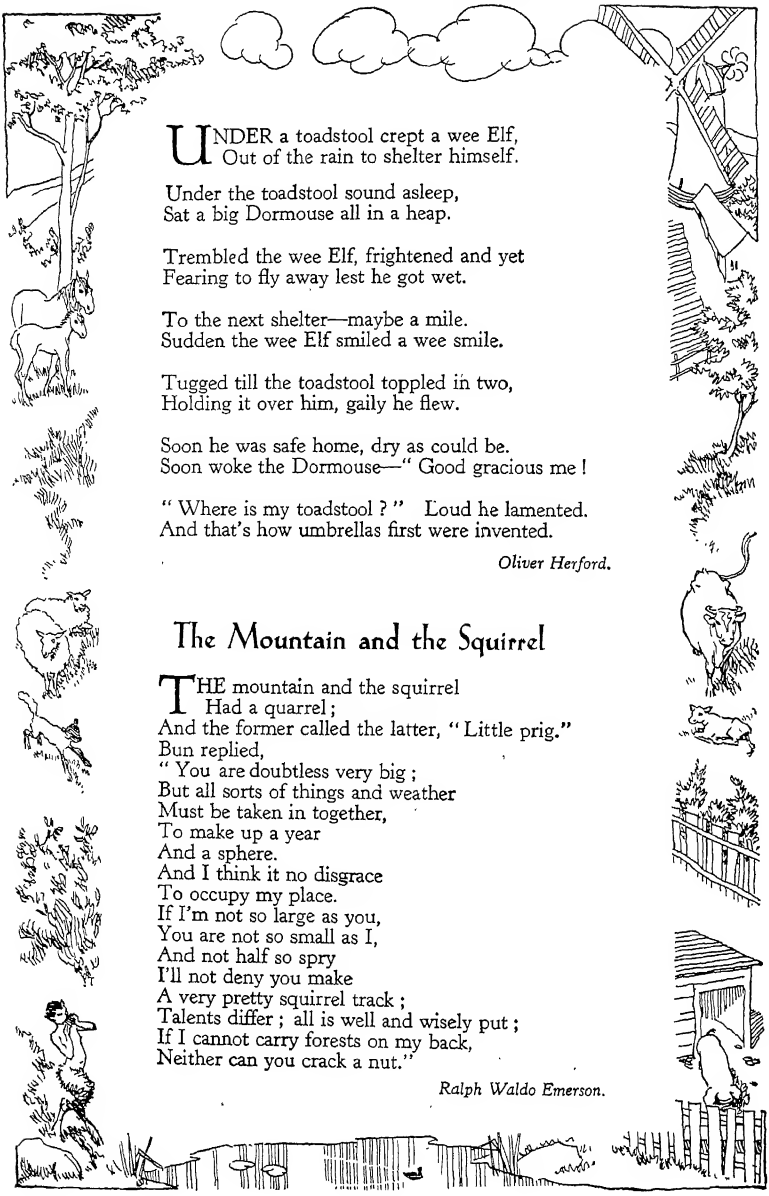


"COME!" said Old Shellover,
"What?" says Creep.
"The horny old Gardener's fast asleep;
The fat cock Thrush
To his nest has gone,
And the dew shines bright
In the rising Moon;
Old Sallie Worm from her hole doth peep;
"Come!" said Old Shellover.
"Ay!" said Creep.

Walter De La Mare.



The Elf and the Dormouse



UNDER a toadstool crept a wee Elf,
Out of the rain to shelter himself.

Under the toadstool sound asleep,
Sat a big Dormouse all in a heap.

Trembled the wee Elf, frightened and yet
Fearing to fly away lest he got wet.

To the next shelter—maybe a mile.
Sudden the wee Elf smiled a wee smile.

Tugged till the toadstool toppled in two,
Holding it over him, gaily he flew.

Soon he was safe home, dry as could be.
Soon woke the Dormouse—" Good gracious me !

" Where is my toadstool ? " Loud he lamented.
And that's how umbrellas first were invented.

Oliver Herford.

The Mountain and the Squirrel

THE mountain and the squirrel
Had a quarrel;
And the former called the latter, " Little prig."
Bun replied,
" You are doubtless very big;
But all sorts of things and weather
Must be taken in together,
To make up a year
And a sphere.
And I think it no disgrace
To occupy my place.
If I'm not so large as you,
You are not so small as I,
And not half so spry
I'll not deny you make
A very pretty squirrel track;
Talents differ; all is well and wisely put;
If I cannot carry forests on my back,
Neither can you crack a nut."

Ralph Waldo Emerson.



A. W. Kerr.

BREAKING WAVES AT LEE BAY, NEAR LYNTON, NORTH DEVON

This type of picture is best left to the professional. It requires considerable technical knowledge, coupled with the use of panchromatic plate or film, and a high-speed lens and shutter to catch the action of the breaking waves, and at the same time to render a true version of the colourful surroundings.

COLLECTING WITH THE CAMERA

PHOTOGRAPHY is so common a hobby nowadays, thanks to the cheap film-using camera, that many of our readers will already have accumulations of " snaps " taken by them at one time or another. A large number of the subjects will doubtless be of a personal kind, and of little interest to anyone but the photographer and a small circle of relations and friends. Also, it is more than probable that many of the prints, owing to defects in exposure, lighting and composition, fall below the standards of good photography.

Subjects Carefully Chosen.

What we are concerned with here is not the accumulation of such random snapshots, but the making of a collection of photographs of subjects chosen on their merits as being interesting in themselves, quite apart from the circumstances in which they were taken. Meeting with such subjects is admittedly partly a matter of luck, and partly dependent on the extent of one's travels. The recognition of them when one sees them means in many cases that one has settled with oneself beforehand what sort of subjects one wants to collect.

And here, a few suggestions that may be useful : To begin with, fight shy of what may be called picture-postcard subjects. Leave it to the professional to record Brighton beach or folks bathing at Margate. You can buy plenty of this kind of stuff cheaply.

Second, don't waste films on expan-

sive scenes, which look very nice to the eye, but are very disappointing when reduced to a small picture of a few square inches—we assume a hand camera to be used. Third, unless the subject is particularly interesting, and the chance of taking it may not recur, don't snap it if the light is so bad that the best you can hope for is a very under-exposed negative, followed by a correspondingly washy print, lacking strength and detail. Goodness only knows how many films are exposed annually by amateurs, young and old, under hopeless conditions of lighting. Fourth, don't bother about subjects of movements too rapid for the ordinary camera to capture, such as waves breaking at close quarters, and trains travelling at high speed. Special forms of shutters are required for dealing with them.

Now for the other side of the matter. Suppose that one day, while moving through country new to you, you espy a windmill in the distance—one, too, which is in working order. Here *is* something worth a film or two, for windmills are both interesting in themselves and for their associations, and are becoming fewer every year because, from a mechanical point of view, they are out of date. Before you are old yourself, windmills of the old kind may be a very rare sight indeed, so a photograph of one that no longer exists will be valuable as a record.

Therefore, as you approach the mill, you decide to take some trouble over it, especially as it proves to be one of the old "post" type mills, with a body revolving as a whole on a low conical base. After having a good look at it from all sides, and noting the lighting,



A. W. Kerr.

THE VILLAGE OF JEVINGTON, SUSSEX, AS SEEN FROM THE HILLSIDE AT FRISTON

A charming scene which to the eye appeared most effective, proved a disappointment when rendered in tones of black and white only, being thus robbed of the natural colourings which were its greatest attraction. What may be termed expansive scenes are often very disappointing when reduced to a small picture.



WINGED SPEED! A GULL IN FLIGHT *A. W. Kerr.*

An excellent example of successful high-speed photography. This picture was taken with a shutter speed of one-thousandth of a second, but even this terrific speed was not fast enough to record the picture without showing some movement in the wing tips of the bird.

you make three exposures from different points, being careful to hold the camera upright and to get the picture well centred in the finder. It is possible that it may be advisable to sacrifice size to a good view-point. Coming too close may lead to tilting of the camera and distortion of the image.

Having secured, we will hope, some good pictures of this particular type of mill, you should keep your eyes open for examples of the other type, the tower or "smock" mill, with a top rotating on a high conical tower of brick or masonry. Mills of this type vary in shape of tower, number of sails, and other details. If you maintain a watch for differences you may in the end get together—especially if your travels take you into the Broads district of Norfolk—a really valuable set of windmill photographs. You will then have done some real "collecting with the camera."

Of course, we have selected windmills merely as an example. There are plenty of other subjects worthy of attention: ancient monuments, quaint churches, interesting gateways, odd inn signs, old houses and cottages, village crosses, sundials, queerly clipped hedges, noteworthy trees, unusual occupations or unusual incidents in everyday life, curious happenings, local games and customs, and a host of other things—old, passing, or out of the common. As soon as you have collected a few examples of any one subject, it becomes interesting to add to them, and the interest and value of the collection will increase more rapidly than the actual number of examples.

It is only in the nature of things that we should run up against specially good

subjects when our cameras have been left at home, and become sympathetic with the remark of the cowboy turned loose in New York: "What a lot of queer folk one sees around when one hasn't got one's gun." The moral of which is, that the keen collector should keep his "gun" handy whenever there is a reasonable prospect of sport.

The changes that are always going on give the collector his opportunity sometimes. Perhaps some interesting old houses in your neighbourhood are to be pulled down to make room for larger new buildings. Out with your camera and get a picture of them while you may. Or a picturesque lane near your home is to be swallowed up by an arterial road, which will devour the old trees on either side of it. In time to come it will be interesting to compare the lane that was with the wide road that is. One has to think of the future as well as of the past and present. Looking back over the last thirty years, the writer realises what a lot of chances he failed to take. Those very early motor cars and motor bicycles and aeroplanes, for example, a series of snaps of which would now be highly entertaining had it been made.



A. W. Kerr.

THE PORCH OF JEVINGTON CHURCH

A type of subject which can form the basis of a very interesting and valuable set of pictures. Innumerable examples of old church gateways, fonts, etc., are to be found in all parts of the country, and a good series of these is sure to find a market at some time or other.

Cameras and Lenses.

The smaller the camera is, the more convenient and lighter it will be to carry, and the cheaper the films used in it are. The quarter-plate (4¼ by 3¼ inches) size seems to strike the happy medium between cumbrousness of apparatus on the one hand, and excessive smallness of picture on the other. Where a very

A STUDY IN CLOUDS



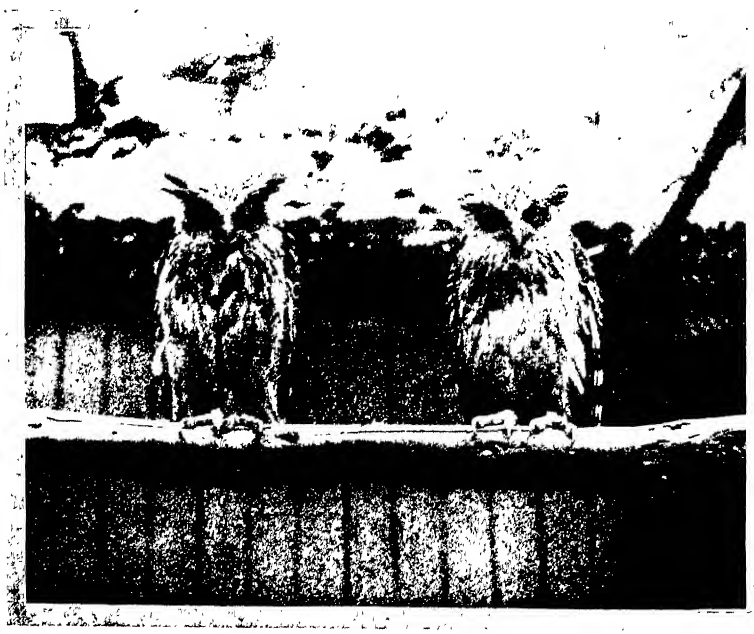
A. W. Kerr.

Here is an excellent photograph of the Old Mill at Shirley, in Surrey, taken on a typical day of April. In this case, although a closer view-point was possible, it was better to sacrifice the size of the mill, and take the picture from a more distant spot. The young photographer should note the beautiful sky effect. This yields a decided pictorial improvement on a "close-up" of the mill only.

small film is used, the temptation to get as large an image as possible is great, and there is then less scope for correcting things by trimming the print. The quarter-plate size has the further advantage of being right for making lantern slides from negatives by direct printing in a frame.

But, whatever size be selected, it is essential that the *lens* be good—one that gives sharp definition all over the film with a stop large enough for rapid snapshotting. To grudge spending money on the lens is the worst possible economy, for any saving thus made will be heavily nullified by wastage of films, time and trouble, to say nothing of the disappointments of failure. A good lens is not necessarily an expensive one. Many cheap cameras have surprisingly good lenses. But if your lens proves to be second-rate, scrap it at once and get a better. A good one will yield negatives sufficiently sharp to give satisfactory enlargements. This is a matter of some importance, since in many cases subjects are greatly improved by enlargement, as the magic lantern proves clearly enough.

One should make a point of providing each photograph with details of the place in which it was taken and any other particulars that will increase its interest as an item in one's collection. Gathering such particulars may mean asking questions at the time of taking. So in any case a notebook should be carried. At least one make of camera now enables the user to write the name of the subject on the film as



MALAYAN FISH OWLS AT THE LONDON ZOO *A. W. Kerr.*

The Zoo was ever the happy hunting ground of the photographer, both amateur and professional. It offers endless scope for the person blessed with imagination. Humour, pathos, dignity and impudence are all here—to be had for the taking—and nature studies of this type are most profitable stock.

PHOTOGRAPHING ANIMAL FRIENDS



Farmyard horses lend themselves to the making of fine pictures. A close-up of a good head will always appeal to the animal lover.



Endless patience is necessary in the case of puppies or kittens. They cannot be posed as desired, nor will they remain still for long.



The chief difficulty in the photography of cats, especially when the animal is one's own pet, is that they will often persist in following the photographer closely around, rubbing against his legs. Taken unaware however, they make charming studies.



Photos: A. W. Kerr.

Most papers or periodicals run an animal feature, and will welcome sharp pictures of this type. Make your exposures when the animal is in quiet mood, as it is only a waste of time and material to attempt an exposure when a puppy wants a romp.

soon as it has been exposed. This is a great convenience. In the absence of such a facility, the number of the reel and film should be jotted down in a notebook, and the necessary particulars be added. Then, as soon as a print has been made, the information should be transferred to it from the notebook. If one is not methodical, the time will come when one will wonder in vain what some prints represent, and when and where the negatives were taken, and a great part of their value will be lost.

Arranging Photographs.

The storing of a large and growing collection of photographs needs careful consideration. Whatever method be employed, it should allow for regrouping or rearrangement without difficulty. If an album with leaves, each large enough for several photographs, is to be used, the prints should not be stuck to the leaves and so be made fixtures. Rather trim a print down to give the best effect, run a light pencil mark round it, and make cuts through the paper across the angles, for the corners of the print to be slipped into. The prints can then easily be removed for any purpose. If this system of fixing be allied to the use of loose-leaf albums, the rearrangement of a collection becomes a very easy matter. New sheets can be quickly added in the proper places as any section expands, and one has perfect control of the collection to whatever size it may grow. A very convenient alternative is to affix the prints separately to cards or sheets of stout paper of uniform (and ample) size, which are filed upright in a drawer of suitable dimensions. "Guide" cards may then be used at the beginning of each section or subject, to assist the finding of any print.



A. W. Kerr.

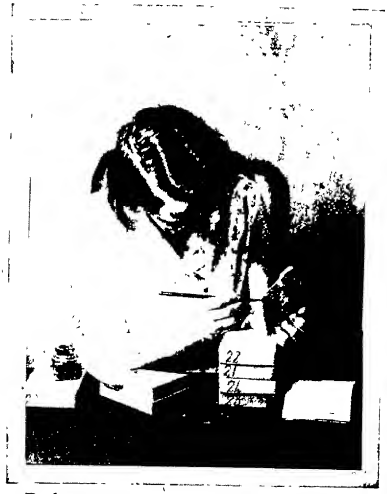
THE AUTOGRAPHIC ATTACHMENT

Some film cameras, such as that shown here, are fitted with a device which will enable the user to record directly on to the film, at the time of taking the picture, useful details such as exposure, shutter speed, lens aperture, etc., or a description of the subject —as desired. This information is invaluable to the amateur for the purpose of his records.

The Importance of Method.

If you organise your photographic work methodically from the start, you will presently be very glad that you did so. Imagine yourself faced at the end of, say, five years' time, by hundreds of prints and hundreds of negatives,

HOW TO STORE YOUR PICTURES



Each negative should be clearly numbered on the border, in Indian ink, after which it is placed in a transparent bag or envelope to prevent scratching or damage to the delicate surface of the emulsion.



The card index will be found most useful. Details of your negatives are entered in alphabetical order, and each item numbered to correspond with the box in which it is stored.



Photos: A. W. Kerr.

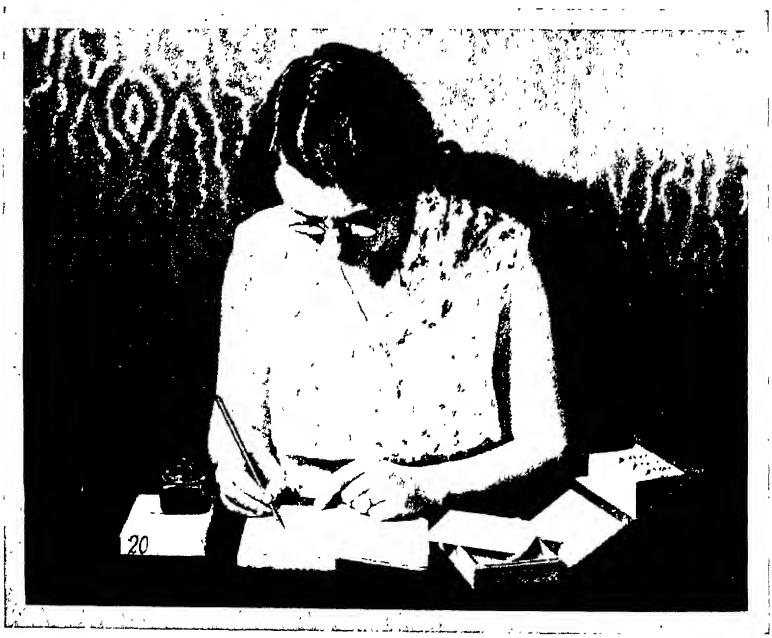
Old plate boxes can be utilised for storing purposes, each box being clearly numbered on the outside and stacked in numerical order to facilitate finding as required. It is essential that the negatives are replaced in the correct box.

none of them with any means of pairing or identification, and having to straighten out the tangle.

Again, suppose that you had worked "to plan," as follows: The foundation of your system is a small ledger, ruled for number of film, description of subject, date of taking, and place of taking.

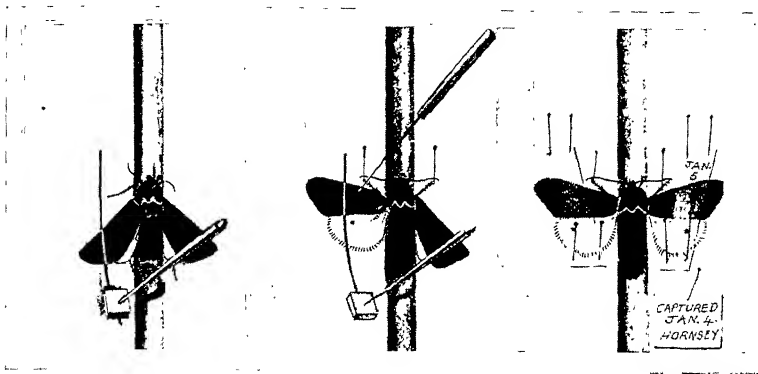
As soon as a negative has been developed, it is (if worth keeping) given a progressive number on the edge in Indian ink. This number is transferred to the ledger, and the other details written opposite it from your field notebook. You now have the negative identified "for keeps." A print made from any negative for the collection is given the number of its negative. The negatives are filed in numerical order, each in a transparent protective envelope. If you want to make further prints from any negative, you have merely to consult the collection print for its number. What could be simpler?

The making of the collection will mean a continual, if moderate, spending of money on films, paper and chemicals. But so many editors of papers and magazines are now ready to use interesting photographs, or short articles on interesting subjects illustrated photographically, that some, if not all, of the cost may perhaps be recouped. This is a further reason for taking trouble over the selection and finishing of one's photographs, since the better the pictures are in both subject and quality the more acceptable they naturally will be.



THE NEGATIVE LEDGER *A. W. Kerr.*

One of the most important points to be remembered in the collection of a series of photographs is that the correct description or title is supplied with each print. It is impossible to memorise full details of some hundreds of negatives, and a small ledger (which should be written up to date) will be found invaluable.



Photos and drawings specially prepared for this work by Bayne and Aris.

SETTING A SPECIMEN

In this picture we are shown how to set a butterfly or moth. This is the needle and bristle method and, beginning at the left of the picture, we see the three steps in this simple little operation, as described on p. 238.

BUTTERFLIES AND MOTHS

THE collecting of butterflies and moths has the advantage of being very inexpensive—except in personal effort, since one usually does not *buy* for one's collection—and of being done mostly in the open air.

A Full-time Hobby.

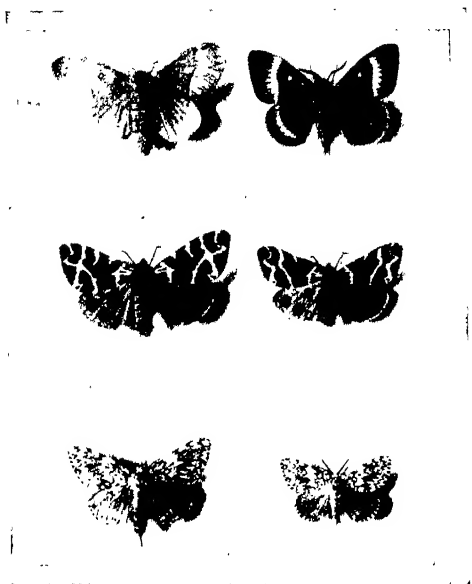
The catching of the nimbler varieties of butterflies entails a good deal of healthy and strenuous exercise, as any seasoned collector will agree. Between them, during the warmer months of the year, butterflies and moths offer plenty of scope for devoting time to the pursuit of them; since one may hunt butterflies all day in suitable weather and, when dusk falls, transfer one's attention to moths, which get up about the time when butterflies go to bed—most of them, that is to say. During the summer holidays the enthusiastic entomologist—to give the collector of insects his rather formidable scientific title—will find plenty of work for his waking hours, however long they be.

Leaving the great rarities, such as the Purple Emperor, Camberwell Beauty and Swallowtail, out of account, anyone who perseveres can make a fairly complete collection of British butterflies, the species of which are not very numerous. They include, however, many beautiful insects—who could deny the adjective to the Purple Hairstreak, Orange Tip, Clouded Yellow, Red Admiral, Peacock, the Fritillaries, and the Blues, for example?—and, when assembled in the store-box or cabinet, make a fine display of colour.

What moths lack in the matter of

brilliant hues they more than atone for in variety, since British species number over 2,000. Not but what some of them—one thinks at once of the Tiger Moths, Burnets, and Underwings—are gay enough, and a great many very beautifully marked. No collector can expect to get together a complete collection of this order of insect; but by way of consolation the field is so large that there are always species still to be captured.

CATERPILLARS AND PUPÆ.—Collecting does not necessarily begin with the capture of the insect, which, after all, is in the third of the three stages of its existence. For the collector will always have an eye wide open for caterpillars, which may be caged and fed till they turn into pupæ or chrysalises; and for chrysalises also. If things go right, a chrysalis will in due course present its finder with a perfect insect, and repay him for any trouble taken in the getting and keeping of it.



MOTHS TO TAKE BY ASSEMBLING

This photograph shows three species of moth, the males of which can be taken by "assembling." The females are on the left and the males on the right. At the top is the Oak Eggar Moth, in the middle the Common Tiger Moth, and at the bottom the Black Arches Moth. From the collection of Ernest Aris, F.Z.S.

The Collector's Equipment.

First, of course, we put the *net*, which should be shaped like a round-ended sack, and *not* like a jelly-bag, so that a "catch" may not be able to tuck itself away into a corner. The net can be made at home easily enough, out of a square yard of green leno, doubled and sewn up one of the long edges. One end is then rounded off to an arc of a circle, and stitched, while the other is hemmed firmly to a band of linen, doubled so as to form a tube for the ring of cane which keeps the mouth open. As for the ring itself, if a small extra expense can be faced, there is much to be said in favour of one subdivided into three pieces which fold or can be taken apart for packing into a small space.

Butterflies used to be killed by pinching their bodies sideways, but this is a very crude method and almost invariably damages the specimen. For moths a *killing bottle* has always been necessary, and it is best that butterflies should be dealt with in this way also. The killing bottle had better be bought from a dealer. A supply of *glass-bottomed boxes* of different sizes which "nest" into one another should be taken on an expedition for holding live specimens which later on, after examination, may prove not to be wanted. Then, one

must carry a cork-bottomed *collecting box* in which to place killed insects after they have been "pinned," and in order that they may be pinned one must have with one a stock of special entomological *pins* of various sizes, coated with black enamel to prevent corrosion. The collecting box is lined with cork. This cork should be kept damp in order to prevent the insects from becoming stiff before the collector is ready to set them.

To hold all the items (except the net) named above — and perhaps some food as well—the list must include a *haversack*, preferably one with a strap of a wide webbing, which will not gall the shoulder.

So much for the field equipment. There remain the articles needed for dealing with the insects brought home. The most important of these is a series of *setting boards*, either flat or round topped, with a central groove for the insect's body. Several sizes will be needed. The best are of cork mounted on a wooden base, which has extended ends to slide into grooves of a setting case like shelves. The handy boy can easily make a setting case for himself. It stands upright like a cupboard, and should have a closely fitting door, in which there may be an opening covered with wire gauze. The equivalent of grooves may be made by nailing to the sides pairs of slips $\frac{3}{16}$ inch thick, set the proper distance apart. It need hardly be said that all the setting boards to go into a case must be of the



THE NET

The above illustration shows the construction of the net. A four-jointed cane is passed through the linen tube at the mouth of the net and its ends are inserted in the two arms of the Y-piece which is made of metal tubing. The handle is thrust into the base of the Y. Black gauze is best for the net, as it shows the captured insect clearly.



THE KILLING BOTTLE

This should be bought at a naturalist's shop. It contains a small quantity of cyanide of potassium, a very deadly poison. This is covered with a layer of plaster of Paris which, being porous, allows the fumes to come through and asphyxiate the insect. Above this there is a bed of cotton wool which prevents the insects from damaging their wings. The cork of the bottle must fit perfectly.

same length. A setting case is a most useful thing, as it prevents insects being damaged while on the boards.

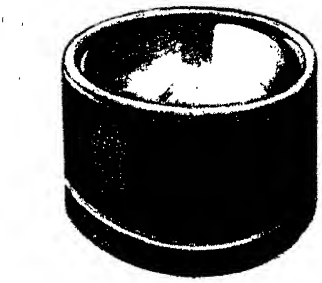
Store Boxes.

These are for housing the collection in, and their number must, of course, increase with the size of the collection. They can be made cheaply out of soap or similar boxes, a number of which of the same kind and size should be obtained, if possible, at one time, to make sure of their matching. Choose only those in good condition, and as well made as such things are. Soak off any adhering paper and fix the lids on firmly with fine brads. Then round off all corners with sandpaper, to present as neat an appearance as possible.

A mark is now run round the box exactly half-way between top and bottom with a gauge. The box is then slit very carefully along the line with a fine tenon saw. The raw edges of the halves are now smoothed down, and the inside of what were the top and bottom lined with sheet cork—or better still, cork lino, if odd pieces can be got from an upholsterer—firmly glued down. Next, thin slips are glued on the inside of one half all round, reaching from the bottom to $\frac{3}{8}$ or $\frac{1}{2}$ inch above the top, to make a lip round which the other half will fit snugly, and will be prevented from getting "out of register," while the box is rendered more or less dust-proof. The projecting edges are bevelled off slightly towards the inside to assist closing.

The last touches are to line the box inside with white paper, stain it or cover it with binding "cloth" outside, and fit hinges on one half, and hooks on the other. Of course, one cannot expect to turn out of such rough material boxes which will compete in appearance with those sold by dealers: so before starting manufacture the collector might well consult a good catalogue and then decide whether to make or buy.

While on the subject of store-boxes, reference should be made to the importance of pinning into every one of them a piece of naphthalene, encased in paper well perforated with pin-holes, to keep at bay the mites which attack set specimens if given the chance.



THE PILL BOX

Glass-topped pill boxes in various sizes are specially made for collectors of insects. They are useful when a collector wishes to examine a captive before deciding to kill it or let it go, or when he intends to take an insect home alive for breeding.

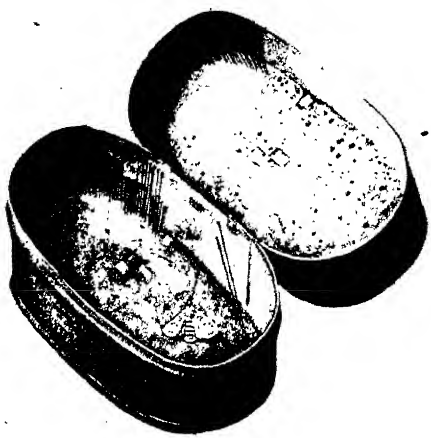
Hunting and Catching.

The catching of butterflies is largely a matter of luck, the proper district for local varieties, fine weather, agility and dexterity. To capture moths on the wing in darkness is obviously impossible. So the collector has recourse to the fatal attraction that light and "treacle" have for these insects. A strong light near an open window will bring in many moths when the weather conditions are right, and one can have quite good sport on occasions round the street lamps of a town. Then there are illuminated moth-traps, to which entry is easy while escape from them is difficult, for setting up in selected places.

Also, one may take with one a net and a strong acetylene bicycle lamp and beat hedges. The insects "put up," as a sportsman would say, may often be netted while flying in the beam thrown by the lamp.

Another method is called "assembling." This is the best method for taking Oak Eggar, Tiger and Black Arches moths. A young female is enclosed in a lidless box, which is then covered with gauze and hung up on a branch or placed on a tree stump. The scent of the imprisoned moth will soon attract males of her own species from all quarters, and they can be caught as they are fluttering round the cage.

But the surest method of capturing many varieties is "sugaring" with a mixture of treacle and rum. Selecting a calm and warm evening, one smears the treacle with a brush on the trunks

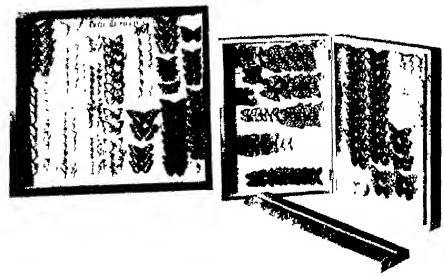


THE COLLECTING TIN

This is a tin box lined with cork. In it should always be carried a supply of assorted pins to suit various sizes of insect. The collector should be careful to keep the cork damp, otherwise his specimens will become rigid before he reaches home and he will then have all the trouble of relaxing them.

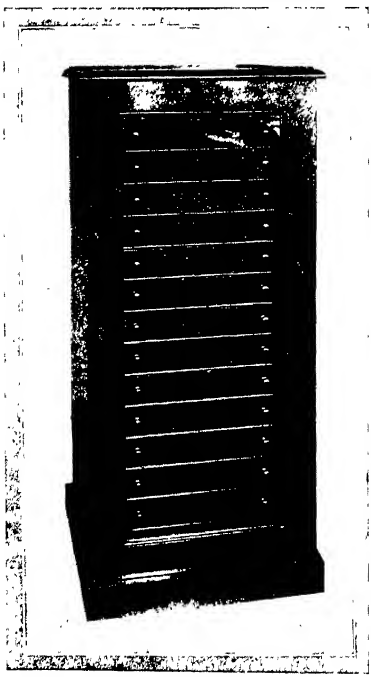
and any easily reached branches of trees. The scent of the treacle attracts the moths as surely as the nectar of flowers, and the rum renders them — well, "incapable," so that they are easily boxed or transferred from their feast to the killing bottle. The light taken on one's rounds of inspection should be rather weak to avoid scaring the insects.

Blossoming shrubs are good hunting grounds when moths



CABINET DRAWER, STORE-BOX AND SETTING BOARD

On the left is a drawer from a cabinet with various species of butterfly belonging to one family, set out in series. On the right is a store-box, which is so made that the insects can be displayed both above and below. The object in front is a setting board.



THE CABINET

This is an upright chest containing a number of shallow, glass-covered drawers. These drawers are very carefully fitted into grooves.

are in search of an evening meal and the light just suffices to betray them. Pay special attention to lavender, pinks, irises, tobacco plants, phloxes, sweet williams and laurustinus.

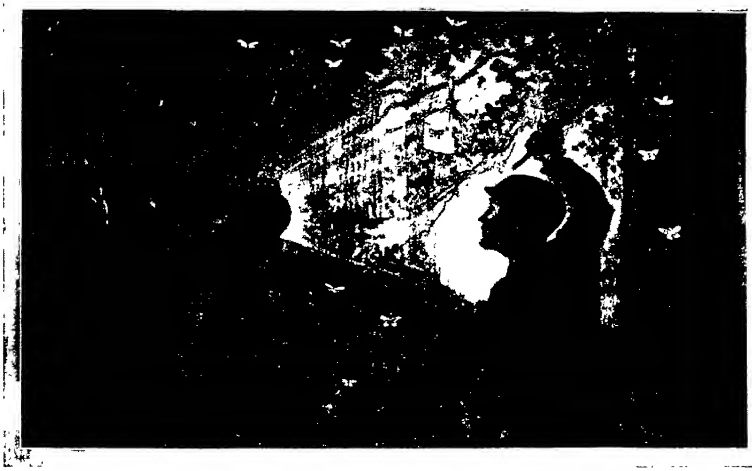
On Setting Moths and Butterflies.

The "pinning" of an insect should be done carefully, through the centre of the thorax, the pin sloping slightly forward. The point should project sufficiently to allow the insect to clear the surface of the store-box easily when the pin is stuck well into the cork.

For setting, one needs a number of strips of paper, ¼ inch wide; and small triangles of thin card, each transfixed by a pin at the centre. A setting needle made by inserting the eye end of a large sewing needle into a wooden handle must also be provided.

We will assume that a butterfly has been placed on the setting board, its body well down in the groove. The wings are parted carefully, and one pair pressed against the board. The front wing is then drawn into position—its most forward point well in front of the head—with the needle and clipped in position by a triangle, the pin of

ASSEMBLING AND LIGHT

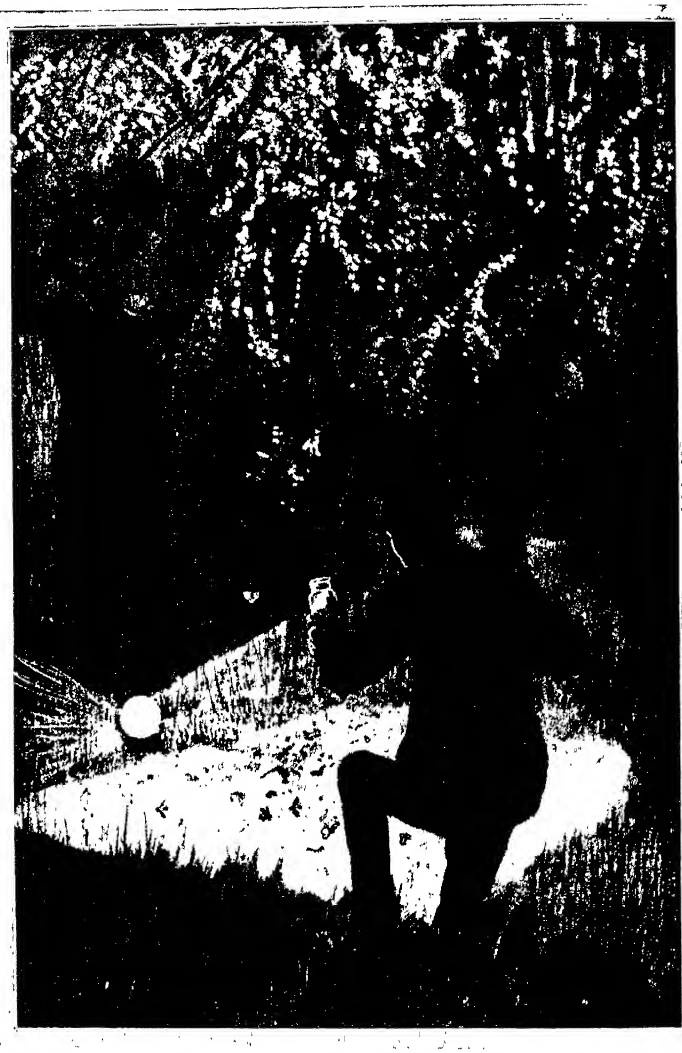


A newly-hatched female is placed in a lidless box, which is then covered with gauze. It is now taken to a locality in which its species is found and the cage is hung on a bough or placed on a tree stump. The males, attracted by the scent of the decoy, assemble in numbers and are netted as they come.



In a woodland glade a sheet is hung up between two trees and illuminated by the light of an acetylene bicycle lamp. The moths are attracted by the light and settle on the sheet. They can be either caught with the net as they fly about in the dazzling rays of the lamp or taken from the sheet in a killing bottle or a pill box.

BEATING THE SALLOWS



When the sallows are in bloom many moths of various species resort to them after dark to sip the nectar of their flowers. This juice is intoxicating and consequently when the branches are suddenly shaken or beaten with a stick the insects drop to the ground. If, therefore, the collector spreads a large white sheet under the tree before beating it he will have no difficulty in finding the moths with the aid of his lamp. The sallow is the "Goat Willow" tree.

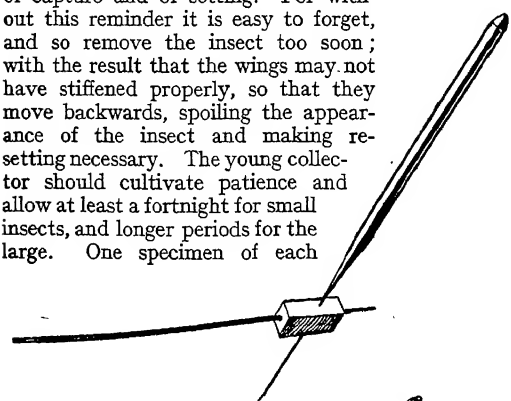
"SUGARING" FOR MOTHS



About half an hour before dusk the collector walks through the wood with treacle pot and brush and paints a patch on the trunk of a tree here and there along the rides. He then retires until darkness falls in order to give the moths time to sip enough of his bait to make them drowsy. When he revisits the sugared trees it is easy for him to select specimens from among the feasting insects and to take them in killing bottle or pill box.

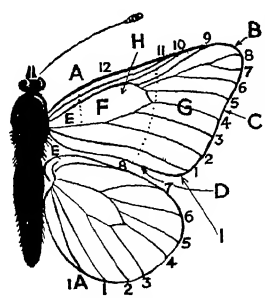
which is tilted slightly to press a corner of the card against the wing. The rear wing is then treated in like manner, its front edge being of course arranged under the rear of the front wing. Finally, a paper strip is laid across the outer edges of both wings and pinned down firmly at the ends. The triangles can then be removed, and the process repeated with the other pair of wings. Each antenna should now be fixed in its natural position by means of pins.

The last, and by no means least important, operation is to pin opposite the insect a scrap of paper bearing dates of capture and of setting. For without this reminder it is easy to forget, and so remove the insect too soon; with the result that the wings may not have stiffened properly, so that they move backwards, spoiling the appearance of the insect and making resetting necessary. The young collector should cultivate patience and allow at least a fortnight for small insects, and longer periods for the large. One specimen of each species of butterfly should be set *upside down*, to show the under markings.



THE SETTING NEEDLE

This consists of a piece of cork, a bristle and a needle. The cork is cut to form a cube. The bristle is then passed through it lengthwise and it is pierced from side to side by a needle. By this means the bristle can be kept in position across the wings of the insect by being pinned firmly to the board.



WING VENATION OF A BUTTERFLY

When setting the wings of butterfly or moth, the points of the needle should be put under one of the veins. The above diagram shows the various parts of the wings, as follows: A cortal margin, B apex, C outer margin, D inner margin, E base, F central shade, G outer shade, H discal cell, I inner angle, 1A internal vein, 1 submedian vein, 2,3,4 median veins, 5 lower radial 6 upper radial, 7, 8, 9, 10, 11 subcortal veins, 12 cortal nerve or vein.

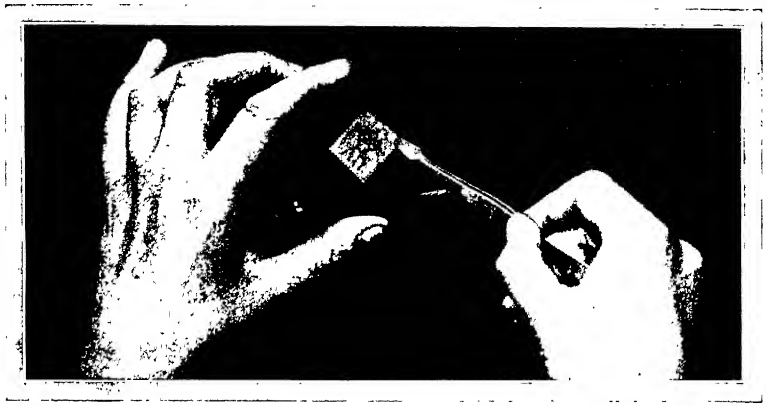
Another Method.

Another method of setting is shown in the picture on p. 229. In the first place the insect already pinned is taken from the collecting tin and placed in the groove of the setting board with wings lightly touching the surface of the board. The setting needle is then stuck in the board below it with the bristle resting on the wings as shown. Next the legs and antennæ should be set. Then the point of another needle should be inserted under a vein of the fore wing. By this means the wing can be swung up into the desired position without danger of being torn. The pressure of the bristle will hold it there. The hind wing should then be treated in a similar manner.

A piece of transparent paper should be placed over the two wings and pinned down securely. When this has been done, the bristle should be withdrawn and the wings on the other side dealt with similarly.

Relaxing.

Any dead insects that have become stiff must be relaxed or softened before they are set. They should be stuck on a piece of cork, and placed in an airtight jar or tin containing a layer of damp sand. A few drops of carbolic acid on the sand will prevent mildew.



Photos by courtesy of Messrs. Bright & Son, Strand, W.C.2.

THE WATERMARK DETECTOR

One of philately's troubles is to distinguish if a stamp has a watermark, or whether it was printed on unwatermarked paper. Here the "Watermark Detector" helps. This is a small black tray on which the stamp is placed face downwards. Dip a small camel-hair brush into benzine, and apply it to the stamp. In most cases the watermark will appear clearly. Benzine is harmless, whether the stamp is used or unused.

STAMP COLLECTING

POSTAGE stamps first came into use on Wednesday, May 6th, 1840, and the centenary was celebrated in this country in 1940 by the issue of special stamps bearing the heads of Queen Victoria and King George VI. Since 1840 new issues of postage stamps have appeared from time to time in all civilised countries. Now the total of different varieties, as given in the catalogue of Messrs. Bright & Son, is about 70,000, which total would be greatly increased if certain varieties of printing, paper, etc., were included, and which are considered by specialists to be distinct issues.

The Growth of a Hobby.

Soon after 1850 a few people began to make ordered collections of postage stamps. The hobby and its followers were regarded at first with kindly contempt. But stamp-collecting has long lived down the sneers of outsiders, and is now the prime favourite among collecting hobbies, indulged in by all classes of the community, from Royal personages and Presidents downwards. Its field is the whole civilised world. Every country has its army of collectors.

The popularity of stamp-collecting is due to several factors. It can be pursued by people of all ages. It needs little space. There is no end to it, for new stamps are continually being issued. In 1931, more than 1,700 new stamps were issued, and in 1932 over

2,000. As time goes on these numbers will tend to increase. It has great possibilities about it, for even the humblest collector may stumble on a lucky "find." And, a very important point, money carefully expended on it to say nothing of time, is well spent, for a collection must of necessity increase its value, if not its actual size, as years go by and old issues become more and more difficult to obtain. For there is not the least likelihood of stamp-collecting ever going out of favour after the manner of many hobbies which have proved to be merely passing crazes.

Moreover, the collector cannot help picking up from his hobby a good deal of geographical knowledge which he might otherwise not acquire. Nor is stamp-collecting without historical value; it has been well said that postage stamps are as little windows through which one gets peeps at a nation's history.

A Collector's Outfit.

As soon as the young collector begins to amass stamps, he will need an *album* in which to arrange and keep them. His first album should be of small size and simply arranged. It is a great mistake to begin with an album so large that years must elapse before it ceases to be a desert of paper containing oases of stamps. When the small album is filled, it will be time to transfer the collection to a larger book.

Some experts advocate the illustrated album, with engraved facsimiles



CURIOUS STAMPS

1. Mafeking, 1900, 3*d* (portrait of General Baden-Powell). 2. Cape of Good Hope, 1853, 1*d*. (triangular). 3. Uganda, 1896, 4 annas (printed by the Missionaries at Usoga). 4. Jhind, 1882, 8a. Native issue. 5. Bamra, 1888. Native type set stamp. 6. Great Britain, 1870, ½*d*. ("the little ½*d*.") 7. British Guiana, 1882, provisional 2c. (These stamps were perforated across with the word "SPECIMEN" to prevent fraud.) 8. Afghanistan, 1898, 2 abasi. 9. Kashmir, 1878, 2 annas.

SOME OF THE EARLIEST STAMPS



1. Barbados, 1852, 1*d.* 2. Great Britain, 1840, 1*d.* 3. France, 1849, 20 centimes. 4. Portugal, 1853, 25 reis. 5. India, 1854, 2 annas. 6. Newfoundland, 1857, 1*d.* 7. China, 1878, 1 candarin. 8. Greece, 1861, 1 lepton. 9. Bolivia, 1866, 5 centavos. 10. Argentine Confederation, 1858, 5 centavos. 11. Spain, 1850, 6 cuartos. 12. Transvaal, 1869, 1*d.* 13. Ceylon, 1857, 2*d.* 14. St. Helena, 1856, 6*d.*

NATIVE RULERS AND PEOPLES



1. Madagascar, 1930, 2c. 2. Mozambique Co., 1918, ½c. 3. Transjordan, 1930, 5m (H H. the Emir Abdullah). 4. Martinique, 1908, 15c. (Creole). 5. Tonga, 1920, 2*d.* (Queen Salote). 6. Kishengarh, 1899, 2 annas (Maharajah Sardul Singh). 7. Cochin, 1918, 10 pies (Maharajah). 8. Congo, 1923, 1.75 franc (Ubangi Man). 9. Somali Coast, 1915, 30c. (Woman Native). 10. Congo, 1923, 1 franc (Native Potter). 11. New Zealand, 1920, 1½*d.* (Maori). 12. Johore, 1925, 3c. (Sultan Ibrahim). 13. U.S.A., 1898, 1c. (North American Indians).

ZOOLOGICAL STAMPS

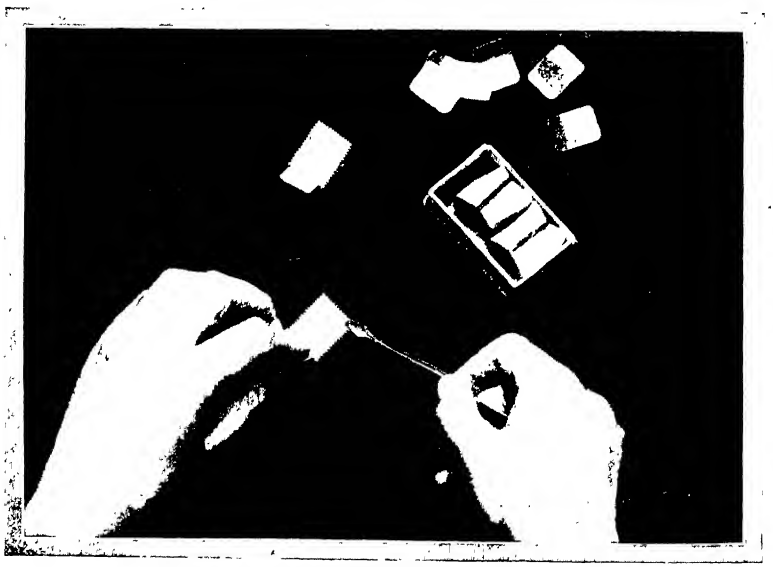


1. Australia, 1½*d.* (The Black Swan of Western Australia). 2. Sudan, 1 mil. (Camel and Postman). 3. U.S.A., 4c. (Hunting the Bison). 4. Malay, 6c. (Tiger). 5. Paraguay, 5c (Lion). 6. N. Rhodesia, 1½*d.* (Giraffe and Elephants). 7. Ethiopia, 8 guerche (Rhinoceros). 8. Australia, 6*d.* (Kangaroo). 9. Australia, 3*d.* (Kookaburra). 10. N. Zealand, 6*d.* (Kiwi). 11. Peru, 10c. (Llamas). 12. North Borneo, 12c. (Crocodile). 13. South Africa, 1*s.* (Gnus). 14. Liberia, 75c. (Hippopotamus).

of stamps to guide the placing. Others are for the unillustrated album. If the first be chosen, it should be one in which the illustrations are good of their kind. The plain album will make necessary a good illustrated *catalogue*, such as any leading firm of stamp dealers issues. If the album selected has spaces on both sides of the leaves for stamps, it is advisable to interleave it with sheets of tissue paper, to prevent the stamps on one page catching on or rubbing against those on that opposite. Even where one side only of the leaves is occupied, interleaving is recommended to protect the stamps against rubbing or being marked by the printing ink of illustrations. Some stamps are very liable to lose colour by chafing.

Finally, the album should be well "guarded," that is, have what seem to be the stumps of leaves plentifully bound in with the leaves themselves. The "guards" make the empty album considerably thicker at the back than at the front, so that as it gets filled it will not tend to bulge.

Another very important item of the equipment is a *perforation gauge*, with which to find out the number of perforations in 2 centimetres (about $\frac{4}{5}$ inch) along the edges of a stamp. The identity of many varieties of stamps can be established exactly only by gauge. The gauge should be printed on stiff card, with the various rows of round dots corresponding to the different perforation numbers arranged round the edges. To use the gauge, a stamp is presented to the rows of dots in turn, until one is found which allows



HOW STAMPS ARE MOUNTED

"Stamp Mounts" are indispensable to the collector. The "mount" is gummed on one side and should be folded back at the narrow edge about a depth of $\frac{1}{8}$ inch, gummed side outwards. Damp the folded part and attach it to the back of the stamp so that the fold is level with the top edge, as shown in illustration. The remainder of the gummed side is then damped and by it the stamp can be affixed to the album leaf. As the "fold" acts as a hinge it can be lifted up and examined for watermark, etc., without being removed.



THE STAMP GAUGE

A very necessary portion of a collector's equipment is the "Perforation Gauge," as difference in perforation is often the deciding factor in determining to what particular issue a stamp belongs and its value. A Gold Coast 1*d.* blue has either 12½ or 14 perforations in a width of 2 centimetres. The method is to fit the perforations of the stamp to the little round dots, as shown in the picture. Upon this "gauge" gradations from 7 to 16½ perforations to 2 centimetres are shown.

all the dots to be seen between the projections of the perforation. The number printed over that row is the perforation number of the stamp.

A supply of *hinges* for attaching stamps to the album will be needed; a pocket *magnifying glass*—preferably one having two lenses, which can be used singly or together—will be very useful for the close examination of stamps, and a pair of *tweezers* for picking up and adjusting delicate stamps should be added if possible. *Transparent envelopes*, sold cheaply by dealers, allow loose stamps to be examined without being touched.

What to Collect.

It has been assumed, when speaking of the choice of an album, that the beginner will devote himself to making a "general" collection of the stamps of all countries. This is undoubtedly the best course to take, for it will give him that general knowledge of stamps which will be of great value if, at a later date, he should decide to specialise. Even a specialist should accumulate and keep as good a general collection as he can get together, since, after having specialised a certain amount in one direction, he may change his mind and enter another field.

The beginner should make up his mind at the start to keep out of his collection all rubbish such as "collectors' stamps," printed to sell to collectors and not for genuine postal use. Some of these are very nice to look at, and they certainly help to fill up space,

EARLY BRITISH EMPIRE STAMPS



1. Newfoundland, 1866, 1c. (King Edward VII. when Prince of Wales). 2 India, 1902, 15 rupees. 3. Canada, 1868, 3c. 4. Malta, 1860, ½*d*. 5. Straits Settlements, 1867, 8c. 6. St. Lucia, 1860, 1*d*. 7. Gibraltar, 1886, ½*d*. 8. Cape of Good Hope, 1864, 2*d*. 9. St. Vincent, 1886, ½*d*. 10. Natal, 1862, 6*d*. 11. New South Wales, 1860, 3*d*. 12. Tasmania, 1870, 10*d*. 13. South Australia, 1902, 6*d*. 14. New Zealand, 1862, 2*d*.

ISTORICAL AND COMMEMORATIVE STAMPS



1. Australia, 2*d*. (Sydney Bridge). 2. Great Britain, 1*d*. (British Empire Exhibition). 3. Chili, 4c (Fifth Pan-American Congress) 4. India, ½a. (New Delhi). 5. San Marino, 30c. (Exhibition). 6. Eire, 2*d*. (Shannon Bridge). 7. Canada, 3c. (Confederation, 50th Anniversary). 8. Switzerland, 7½c. (Peace Issue). 9. Japan, 10 sen (Crown Prince Tour). 10. Japan, 3 sen (Imperial Silver Wedding). 11. Australia, 1½*d*. (Parliament House at Canberra). 12. Costa Rica, 20c. (Nicoya Centenary). 13. Australia, 1½*d*. ("Sturt" Centenary). 14. Canada, 13c. (Ottawa Conference).

but no self-respecting collector will have anything to do with them. Let him also beware of the many forgeries that are in circulation. Some may be discovered easily enough, but others are so cleverly done as to take in even the expert sometimes. Instead of being thrown away when detected, such worthless stamps may be assigned to a special book to form a kind of "rogues' gallery," which will presently acquire an interest of its own.

"Quality rather than quantity" should be the beginner's maxim. Stamps collected for the album should be lightly post-marked, unfaded, clean, free from stains and creases, and properly centred—that is, with the design not cut into by the perforations. Stamps supposed to be unperforated should have a good margin all round. Unscrupulous persons are not above converting perforated stamps into imperforate by trimming off the perforation teeth neatly with scissors! Perforation teeth should be perfect all round.

Of course, the rarer a stamp is, the more difficult is it to come by one that is all it should be. So one may lay down this general rule: if your specimen is not a good one, replace it by a better when the chance offers, for the value of a collection depends very largely on the condition of the stamps it contains.

Unused stamps are in most cases more valuable than used. But they cost a good deal more. As time goes along, used stamps (with certain exceptions) should be replaced wherever possible by unused.

There are to a certain extent "fashions" in stamps, as in other forms of collection. At the time of writing the following countries are specially in favour: Argentina, British East Africa, Ceylon, China, Costa Rica, Dominican Republic, East Africa, Gambia, Honduras, Poland, Uganda and Uruguay.

There is also a great



ALWAYS USE TWEEZERS

Many stamps are ruined by careless handling. Any soiling reduces their value and spoils their appearance, and in the case of unused specimens, especially so. Consequently a pair of tweezers should be used for handling stamps. Collectors adopting this device quickly become expert at employing them, and hardly ever use their fingers, with the result that the good condition of their stamps is preserved.

PICTORIAL STAMPS



1. S. Rhodesia, *2d.* (Victoria Falls). 2. Japan, 2 sen (Fuji Mountain) 3. Papua, *4d.* ("Lakatoi"). 4. Canada, 12c. (Quebec). 5. China, 13c. (Labourer). 6. Liberia, $1 (Steamer and Coast with Surf). 7. France, 10 francs (Port de La Rochelle). 8. Egypt, 1m. (Boats on Nile). 9. Montserrat, 1½*d.* (View of Island). 10. Barbados, 1*d.* ("The Olive Blossom"). 11. Rarotonga, 4*d.* (The Harbour). 12. Iraq, 3 annas (Ruins of Ctesiphon). 13. U.S.A., 1893, 2c. (Landing of Columbus). 14. U.S.A., 1920, 1c. (The Mayflower). 15. Jamaica, 1900, 1*d.* (Llandovery Falls).

GEOGRAPHICAL STAMPS



1. Costa Rica, 1924, 5c. 2. Paraguay, 1924, 1 peso. 3. Cyprus, 1923, 1½ piastres. 4. Mexico, 1917, 40c. 5. Panama, 1892, 1c. 6 Dominican Republic (and Hayti), 1900, 1c. 7. New Zealand, 1923, *1d.* 8. Canada, 1898, 2c. (British Empire). 9. Eire, 1922, *2d.* 10. Canada, 1927, *12c.* 11. Mexico, 1926, 10c. (N. and C. and S. America). 12. Estonia, 1923, 100 marks.

AIR MAIL STAMPS



1. Dutch Indies, 1932, 1 guilder. 2. Siam, 1925, 25 atts. 3. India, 1929, 2 annas. 4 S. Africa, 1929, 4*d*. 5. Estonia, 1924, 45 marks. 6. Poland, 1925, 1 grosz. 7. Syria, 1931, 50 piastres. 8. Belgium, 1930, 5 francs. 9. Australia, 1931, 6*d*. 10. Bulgaria, 1927, 1 leva. 11. Danzig, 1923, 50 marks. 12. Germany, 1922, 10 marks.

demand for Air Mail Stamps of all kinds, as representing the newest method of mail transport. Such stamps would be a particularly interesting subject for specialising, and offer good chances of getting together a really valuable collection.

How to Collect.

Ninety-nine out of a hundred collectors have to start their collections with stamps bought in packets from dealers. It is wise to trade only with good firms, which may be relied on not to foist any rubbish on to the purchaser.

The price of a packet increases out of proportion to the number of different varieties in it. Thus, one of 1,000 kinds will cost much more than ten times the price of a 100-kind packet. To avoid duplication, it is better to save money till a large packet can be bought, rather than to buy a series of small, cheap packets.

After some experience with "general" packets, the collector may proceed to *geographical* packets, each containing so many stamps of one continent or country only. There will be some duplication of specimens, no doubt, but this will give him the chance of replacing imperfect specimens in his



COUNTRIES OR STATES WHICH NO LONGER ISSUE STAMPS

1. Bremen, 1861, 5 s.gr. 2. Modena, 1859, 20 cents. 3. Sicily, 1859, 1 gramo. 4 Brunswick, 1853, ⅓ s.gr. 5. Nova Scotia, 1863, 5 cents. 6. Saxony, 1863, 3 n.gr. 7. Parma, 1857, 40 cents. 8. New Brunswick, 1860, 5 cents. 9. Shanghai, 1867, 60 cash. 10. Western Australia, 1861, *1d.* 11. Heligoland, 1875, 1 pfennig. 12. Lübeck, 1859, 2 schilling.

album, and gathering a stock for "swopping."

The foundations of a collection can be laid quickly enough by purchase. Then follows the really more interesting process of filling up gaps and completing series by "swopping" duplicates, begging from friends; and, when funds permit, occasional purchases from "approval" sheets supplied by dealers.



SOME BRITISH EMPIRE ISSUES

1. Newfoundland, 1c. 2. South Africa, 2*d*. 3. Australia, 2*d*. 4 Malta, 1½*d*. 5. St. Lucia, 3*d*. 6. Gold Coast, 1*d*. 7. Travancore, 1¼ chuckram. 8 India, 1 rupee. 9. Southern Rhodesia, 1½*d*. 10. St. Vincent, ½*d*. 11 Gibraltar, 1*d*. 12. Straits Settlements, 35c. 13. Canada, 5c. 14. New Zealand, 2*s*. 15. Ceylon, 12c.

Care of Stamps.

In the past stamps were treated very badly by young collectors. They were soaked in water to remove any adhering paper, with the result that many of them were badly faded in the process; and stuck into albums with gum smeared liberally over their backs. The value of even rare stamps handled in this fashion was, of course, greatly reduced.

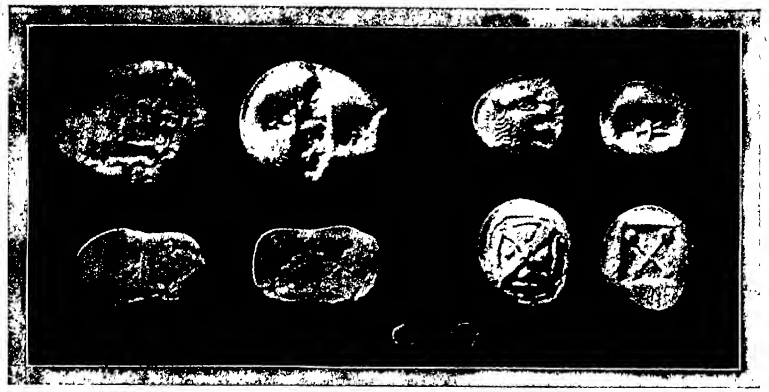
To get any superfluous paper off the back of a *used* stamp, lay it face upwards on wet blotting paper, and let it remain there till the paper comes away easily. In the case of an unused stamp, with its original gum on it, a piece of an old hinge is detached by laying the stamp face *downwards* on *dry* blotting paper and wetting the adhering paper with a camel's hair brush, taking care that the water does not touch the gum.

STAMPS OF THE SECOND WORLD WAR



Plate by courtesy of Messrs. Stanley Gibbons Ltd., Strand, London, W.C.2.

1. Russia, 1943, 3r. (Moscow Conference); 2. U.S.A., 1942, 3c. ("Win the War"); 3. Russia, 1943, 30k. (Capt. Gastello dives his burning aircraft into enemy petrol tanks); 4. St. Pierre and Miquelon, 1942, 25c. (Free French Issue); 5. Polish Post Abroad, 1943, 1z. 50g. (The Underground Press); 6. Australia, 1940, 2*d*. (Australian Imperial Forces); 7. South Africa, 1941–42, 1*s*. (National Defence, large and small issue, the latter for paper economy); 8 Bulgaria, 1940, 2l (Recovery of the Dobrudja from Rumania); 9. U.S.A., 1943, 5c. (Flags of Oppressed Nations); 10. Norwegian Post Abroad, 1943, 20 ore ("V for Victory" Campaign); 11. Curacao, 1941, 35c. (Bomber Fund); 12. Canada, 1942, 20c. (Building a Corvette); 13. Middle East Forces, 1942, 5*d*. (for use in occupied Eritrea); 14. Netherlands Post abroad, 1944. 3c. (Fighter Pilot).



GREEK COINS (*Slightly enlarged.*)

The illustration above shows some of the earliest known Greek coins from Lydia and Ionia. There are five coins depicted, the front and back of each coin being shown. Four of the coins are of a metal called electrum, an alloy of silver and gold. The fifth, in the bottom left-hand corner of the illustration, is of gold. Throughout this section the coins as represented vary slightly in size from the originals. This will be indicated in the captions, as above. The excellent illustrations are included by permission of Messrs. Methuen & Co. Ltd., from their book "Coins and How to Know Them," by Gertrude B. Rawlings.

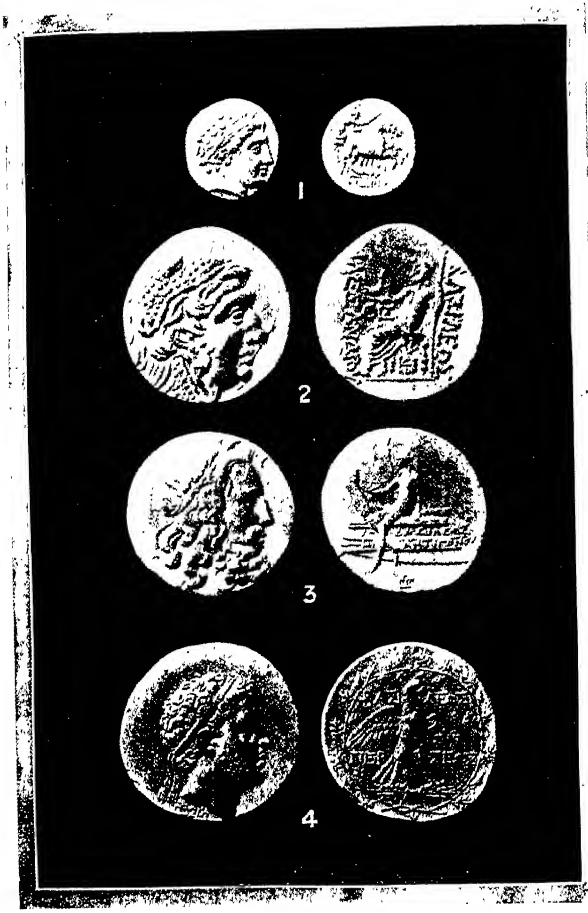
COINS: A FASCINATING HOBBY

THE science of coins, called numismatics, is one which may well appeal to the young collector.

The Earliest Coins.

Coins have been used as a medium of exchange for the last 2,500 years at least. The earliest known were struck in the ancient kingdom of Lydia in the eighth century before Christ; and from that country the use of coinage spread rapidly over Asia Minor, the Aegean Islands and Greece, eventually reaching Rome, which became the centre from which it was carried into many parts of Europe. Whithersoever the power of Rome extended, along with it went Roman coins, which are now dug up in what were then the limits of the known world, telling the story, plainly enough, of Roman occupation. Similarly, Greek coins found in India and Central Asia speak of old-time traffic between those countries and Greece.

It has been said that a complete collection of coins is a history in brief of the civilised world. Certainly some of them are historical documents of great interest. Fig. 15, for example, shows a brass coin bearing on the obverse ("head") side the laurelled bust of the Emperor Vespasian, and the reverse ("tail") side the words "Judaea Capta," and a palm tree to which a Jew is shackled, while a weeping Jewess



GREEK COINS (Macedonia). (*Slight reduction*)

The above illustration shows four Greek coins from Macedonia. Fig. 1 is a gold coin showing the head of the Greek god Apollo on one side, with a charioteer on the other, or reverse, as it is called Figs. 2, 3 and 4 are coins of silver. Notice the very beautiful head in Fig 3.

Colosseum, the huge amphitheatre at Rome begun by Vespasian and finished by his son Titus. How interesting, too, is a shilling (Fig. 29) of Queen Mary's reign, with busts of the English sovereign and her Spanish Consort facing one another; and on its reverse the combined arms of England and Spain. Cæsar speaks in his "Commentaries" of money being in use among the Britons. Some of these very early British coins, struck long before the arrival of the Romans, are evidently copies of the Macedonian Stater first minted in the fourth century B.C. Here, again, can be traced the effect of commerce. But how a design conceived in far-off Macedonia penetrated to (then) back-of-beyond Britain remains a mystery. It may have come by way of the Rhine, or south-about through Gaul and Spain.

sits near him. This little piece of metal, celebrating the subjection of Judaea by Vespasian in A.D. 69 and 70, shows literally the two sides of military conquest—triumph and misery.

Or, again, in a coin of the same period we have on the reverse a picture of the

TREASURES OF THE PAST



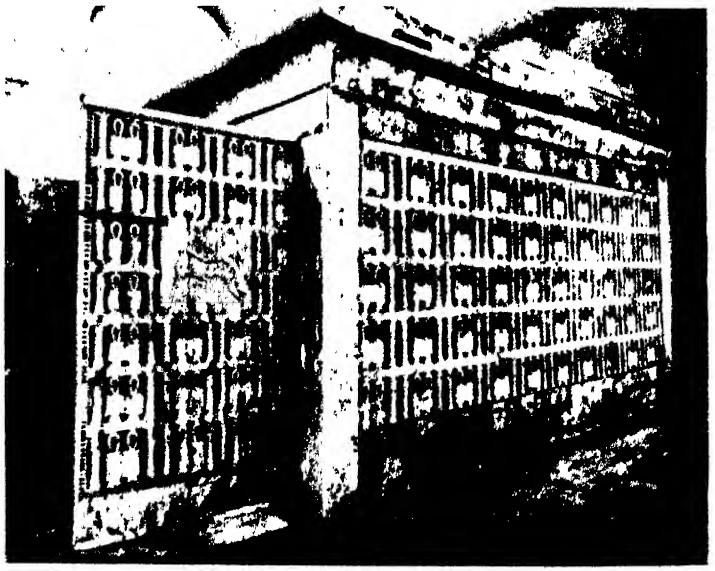
Photographs by Mr. Harry Burton of The Metropolitan Museum of Art, New York. World copyright strictly reserved.

Our knowledge of the world before the dawn of history is largely obtained by the efforts of clever people in collecting together, after very diligent search, the fragments and relics of days long past. Our museums, for instance, are the homes of such collections, where every object can tell us a story; and the romantic unearthing in the desert sands of the Tomb of King Tutankhamen is but a case of curio-collecting on a grand scale. Above is illustrated that impressive moment when the inner tomb was opened and man saw again that which had lain hidden for more than 3,000 years.

WITH ROPE AND SEAL INTACT



Tutankhamen was an Egyptian monarch whose last resting-place escaped the ravages of robbers, and the second compartment, or shrine, of this Tomb was found by the excavators with the doors firmly secured by rope, in addition to bolts. The rope itself still held fast and was further made safe from interference by a seal of clay.



The Egyptians of centuries before the time of Christ believed that the dead in some future existence would have need of many of the things they had used in life. Thus the tomb of a departed king contained a simply amazing collection of objects, each of which helps us to form an idea of what civilisation in those times must have been like. Here we see an example of the art of the period—the massive folding doors of the outer shrine, the panels decorated with headless demons.

WHERE TUTANKHAMEN SLEPT HIS LAST SLEEP



Few events have added more to our knowledge of Ancient Egypt than the exploration of the Tomb of Tutankhamen by Mr. Howard Carter and his co-discoverer, the late Earl of Carnarvon. Our picture shows the fourth of the shrines, one within another, this being the actual place in which the great ruler slept his last sleep. Just inside the open doors we see the arm of one of the goddesses, put there as a protector of the dead. The doors were golden and the carving and decoration superb.

THE GOLDEN MUMMY-CASE OF THE DEAD KING



This is the actual casket which contained the mummy of Tutankhamen. It is now in the Museum at Cairo and was made of solid gold which we should value at £50,000. On the lower part winged goddesses are engraved.



Known as a "Lion Gardant" vase, this was a receptacle for costly oils or unguents. The lion's right paw is clawing the air in rage, and the neck-piece of the vase, above the animal's crown, represents the lotus flower.

TUTANKHAMEN'S SACRED GOOSE



This figure of wood, varnished with black resin, was taken from the Tomb. It is a realistic carving and represents a sacred goose, such as were kept by the old-time Egyptian kings.



The vase here depicted is formed of pure silver, and designed like the fruit of the pomegranate. This fruit, owing to the number of its seeds, has been taken to typify plenty.

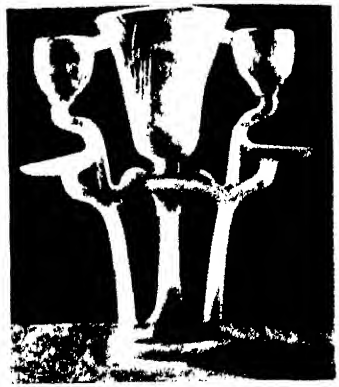


If you could visit the Cairo Museum, where are grouped the priceless finds of so many of Egypt's collectors, you would see the above shrine and would be dazzled by its golden brilliance. This is the second of the four shrines of Tutankhamen. It was as lofty as our modern living-rooms, and upwards of 12 feet in length.

A STOOL AND ORNAMENTS OF ANCIENT EGYPT



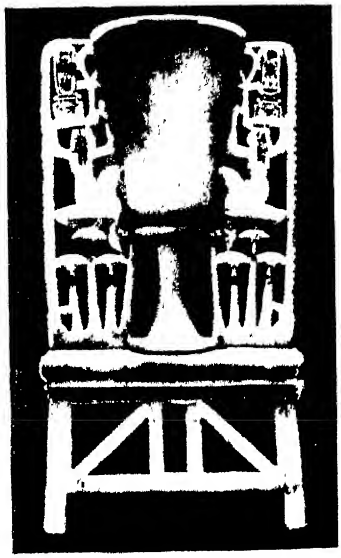
Our photograph shows a three-legged stool from the Tomb. It is of special interest because the feet are those of a dog. In Egypt the cloven hoofs of oxen were more often used.



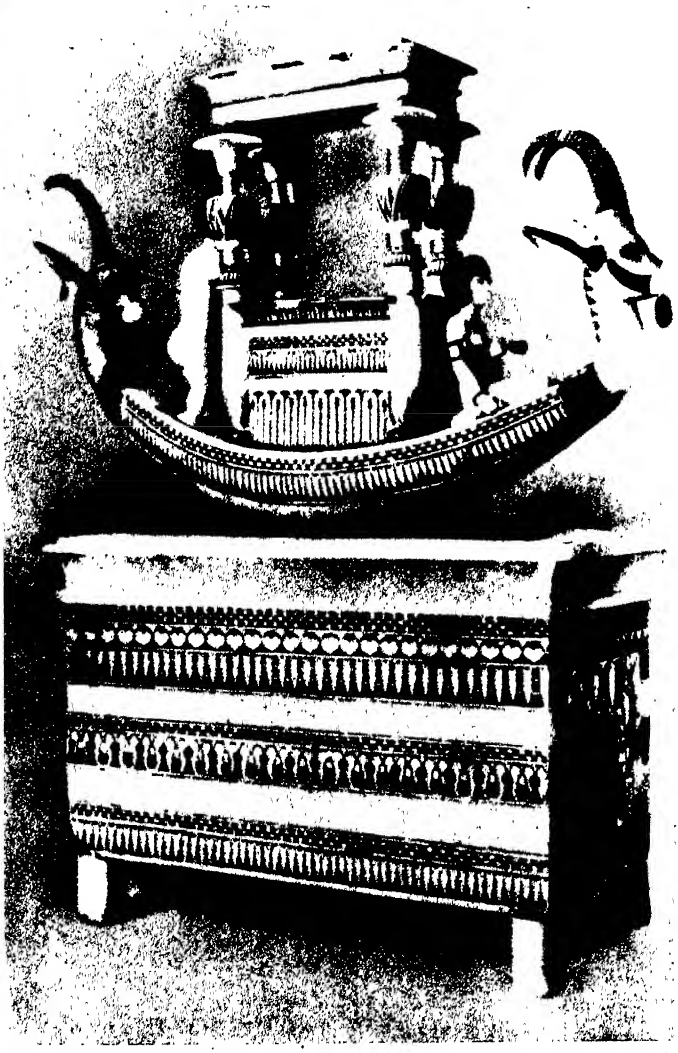
This alabaster ornament appears to be a three-branched candlestick. It represents the "Triad" of Ancient Egypt and corresponds with our modern Christian Trinity.



This lamp is made of a material that is semi-transparent. When a light is placed within the container figures of Tutankhamen and his Queen are brought up in brilliant colours.



Most of these objects were found in an adjoining passage or annexe of the Tomb. This one is an alabaster vase, beautifully carved, and with an inscription of coloured symbols.



In this full-page we see another marvellous ornament taken from the annexe to the Tomb. It is a perfect masterpiece of carving in alabaster, and it may represent a barque or vessel for the journey of the dead king into the next world. At the helm of the ship is a dwarf slave; and a dwarf girl holding a lotus flower to her chest, is placed towards the bow. The carving on the stand below is of wonderful craftsmanship.

THE OLDEST GLOVE IN EXISTENCE



This gauntlet was made of linen for some long-forgotten little child. It is the first ancient Egyptian glove ever discovered, and the oldest specimen of its kind in existence.



The vase here depicted was made to hold wine and bears a vintage mark more than 3,000 years old. It came from Tutankhamen's cellars in the fifth year of his reign.



The four shrines of Tutankhamen stand side by side in the Museum at Cairo, and we see above the upper part of a portion of the second shrine. Its brilliant gold is dazzling, and the scenes delineated actually constitute a guide to the Hereafter, some of them in the form of texts referring to the Underworld.

Coins and Romance.

To very ancient coins belongs the further interest of their having been used by people who lived many hundreds of years ago — a couple of thousand, maybe. For all we know, this silver tetradrachm (Fig. 2) may have been handled by the Great Alexander; that Roman "aureus" (Figs. 10, 13, 14) have circulated in the household of Julius Cæsar; and this humble denarius (Figs. 11 and 12) have rested in the wallet of a Roman Legionary. Anyone blessed with a knowledge of history could weave many a little romance around the coins of his collection.



ROMAN COINS. (*Slight reduction.*)

In this picture some Roman coins are shown. Figs 10 and 13 are gold coins, the others being silver. The crocodile on the reverse of the coin in Fig. 14 is interesting, as it refers to Rome's subjection of Egypt. Fig. 11 shows the head of the great Julius Cæsar. To such impressions of Julius Cæsar's head on coins we owe our knowledge of his appearance.

In the third place, many coins are real works of art, with beautifully executed designs, notably those of the highly artistic ancient Greeks. Others, at the opposite extreme, attract by the very crudity of their ornamentation. For example, a penny of Alfred's time, bearing merely AEL/FRED RE/X SAXO/NUM on one side, and EXA (Exeter, the place of minting) on the other (Fig. 27).

In the Middle Ages.

Between ancient and what may be

called modern coins come a whole host belonging to the Middle Ages, and of modern coins there is a bewildering array of the issues of all civilised countries. Every period and country has its particular treasures, after which the young collector may hopefully strive. Nor are the issues of to-day to be neglected. For a comparatively small sum a complete collection of the silver, nickel and copper issues now current in all countries of the world could be got together. It would at least familiarise the collector with foreign currencies and make quite a good display by itself.



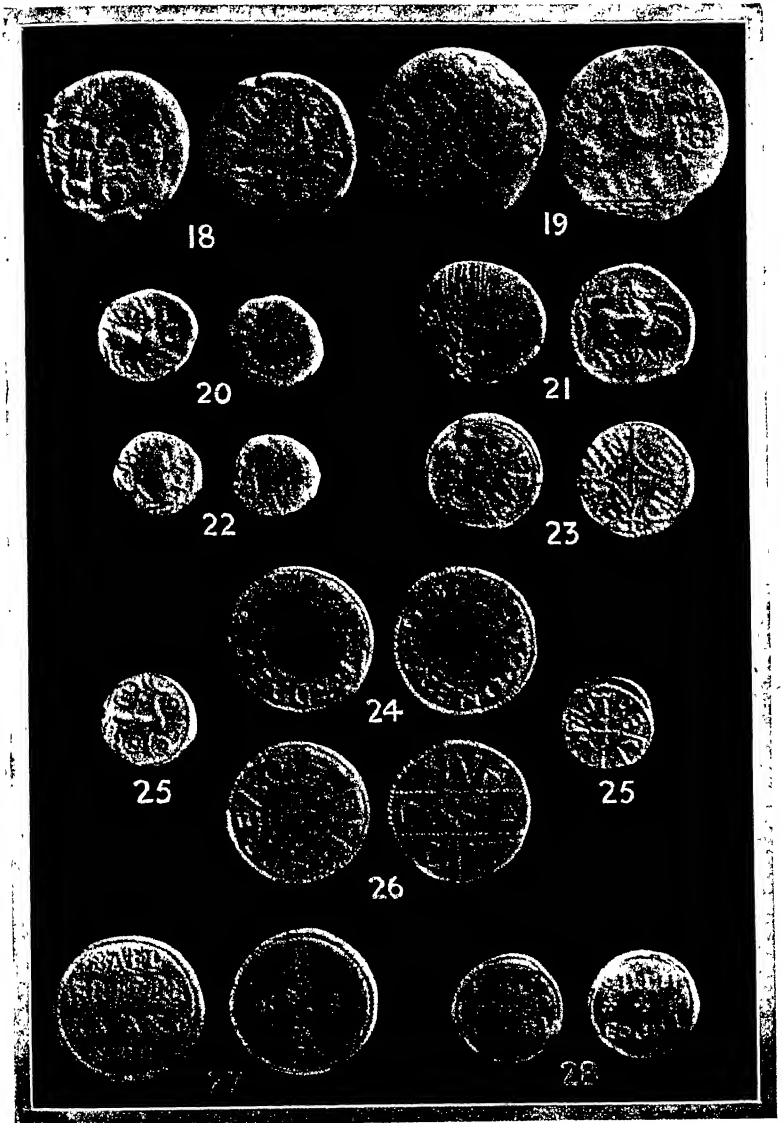
ROMAN COINS OF A LATER DATE. (*Slight reduction.*)

The illustration shows more Roman coins of a later date. Fig. 15 is of brass, Fig. 16 of bronze, and Fig. 17 of gold. The coin in Fig. 15 bears a fine head of the Emperor Vespasian, and the reverse of the coin shown in Fig. 16 is stamped with a picture of the Colosseum, the famous amphitheatre which the Romans used for the fights of the gladiators.

Hints on Collecting.

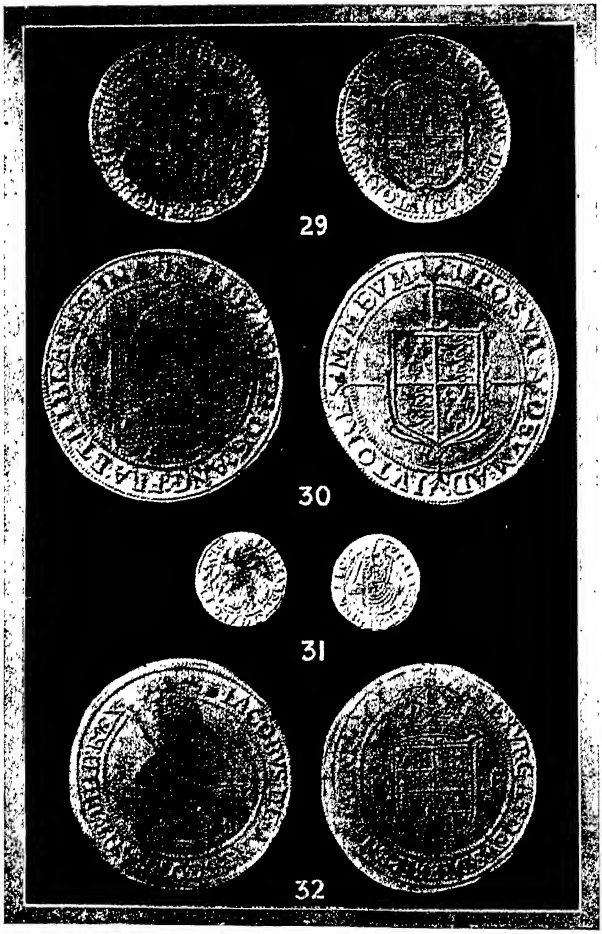
Before one starts collecting in earnest, one should get to know as much as possible about coins generally, and the nature and history of varieties. The most valuable information and advice will be that of someone who has already amassed a good collection. Failing such help, or even where it is available, good books should be consulted.

An excellent and inexpensive volume, which can heartily be recommended, is "Coins and How to Know Them," by Gertrude Burford Rawlings, containing concise letterpress descriptions of the coins of various countries, ancient



The illustration above shows a collection of coins (*slight enlargement*) from Ancient Britain, Saxon England and Gaul, which was the old name for France. Figs. 18, 19 and 21 are gold; Fig. 25 was struck from copper or base silver; the others are silver coins.

and modern, besides many photographic illustrations. The following little books, issued by Swan Sonnenschein & Co., should also be looked for in second-hand bookshops: "Colonial Coins and Tokens," by D. F. Howarth; "Copper Coins of Europe," by Frank C. Higgins; and "English Coins and Tokens," by Ll. Jewitt and Barclay V. Head. All of them are extremely useful guides. In public libraries one can get access to, or perhaps even borrow, books of a more expensive kind.



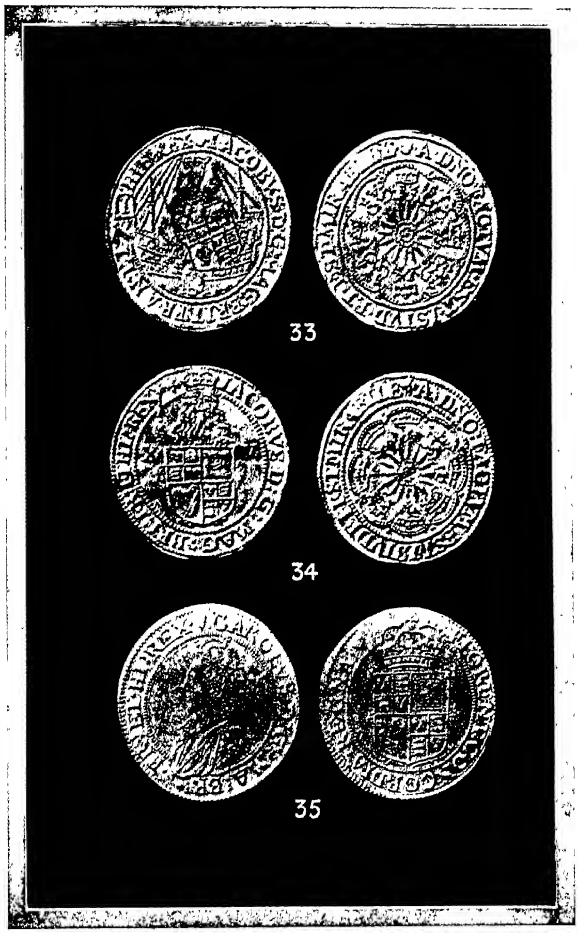
ENGLISH COINS. (*Very nearly actual size.*)

The coins shown here are of a much later date than those in the previous illustration. Fig. 29 shows a shilling; Fig. 30 a silver crown, which bears the head of Queen Elizabeth; Fig. 31 a gold quarter angel (an angel was a gold coin worth from 6*s.* 8*d.* to 10*s.*); Fig. 32 shows a sovereign of the time of James I.

When armed with a reasonable amount of knowledge, the collector will be in a better position to make use of any chances that offer. He should beware of odd coins displayed in the windows of small shops. The shopkeeper as likely as not knows little or nothing of their real value, and to be on the safe side asks much too high a figure. Also, a sharp lookout must be kept for "fakes," some of them very cleverly executed with the aid of electrotyping. Signs of age and wear are not to be taken necessarily as proof of genuineness, or fresh condition as one of lack of age; since carelessly stored coins

soon get the appearance of age, while well-cared-for coins will retain their freshness for centuries. In short, when purchasing, if one's own knowledge is not a sufficient guide, one should deal only with people who have a reputation at stake.

As with postage stamps, so with coins, the collector's aim should be to accumulate as many *perfect* specimens as possible. The worse should always give place to the better.



ENGLISH GOLD COINS. (*Actual size.*)
This illustration shows three magnificent gold coins. Figs. 33 and 34 were struck in the time of James I., Fig. 35 in the time of Charles I.

Care of Coins.

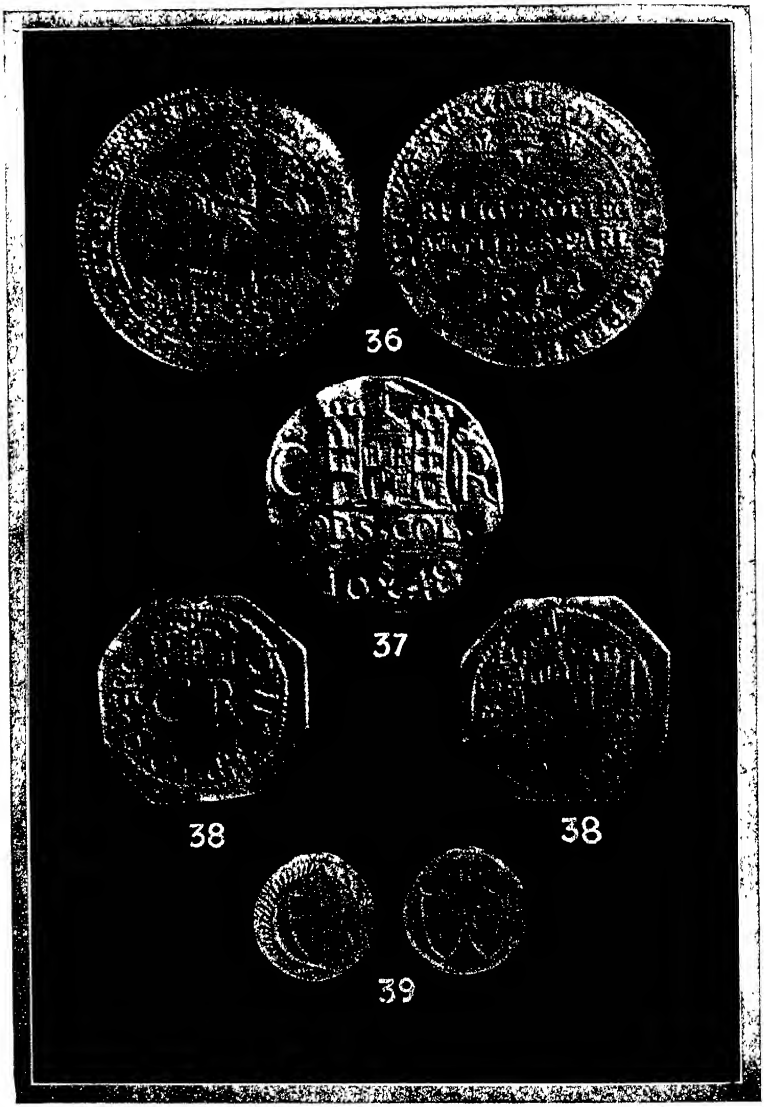
The treatment of old and dirty coins must be guided by the principle that old coins *are* old coins, and should not be made to look like anything else. One should remove any loose matter by steeping in a solution of washing soda, and brushing with an old tooth-brush until the design stands out clearly. But it is a great mistake to aim at brightness in old coins. The removal of the natural oxidised or tarnished surface may take with it a good deal of the value of the coin.

Mint-new coins must be handled very carefully to avoid staining them with the fingers. Lift them flatwise between finger and thumb, pressing on opposite points of the edge.

Storing a Collection.

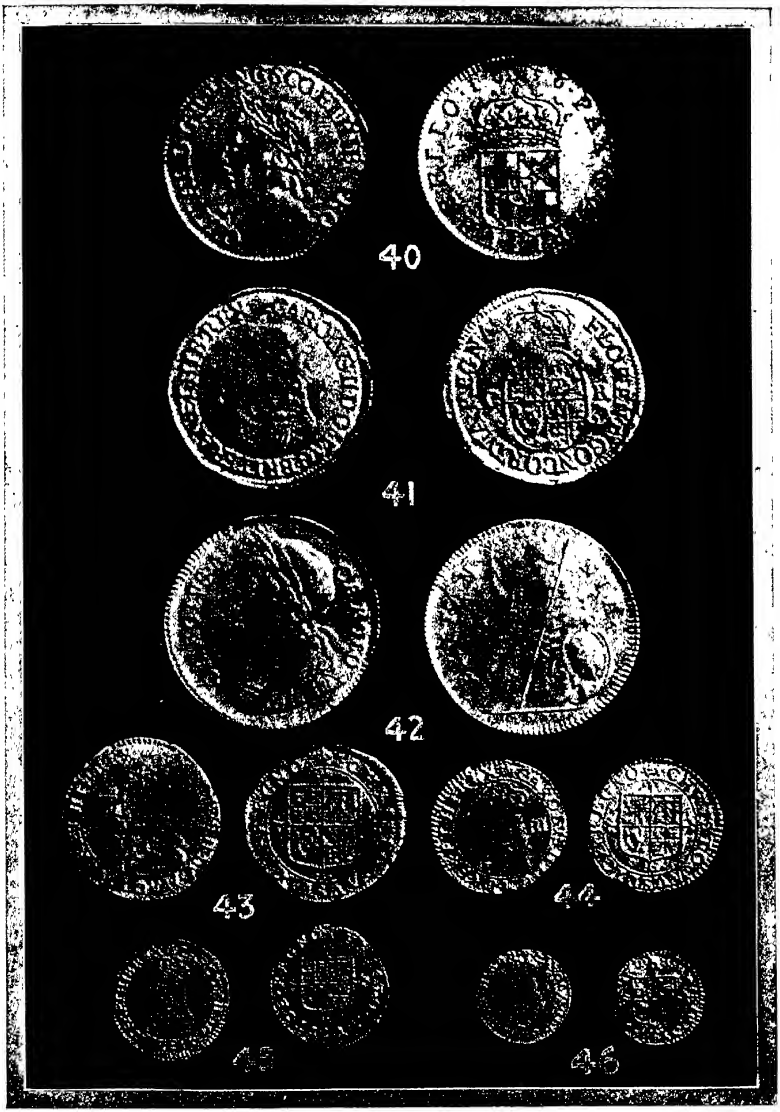
A collection should be kept in trays, housed in a lock-up cabinet.

A CROWN AND A GROAT



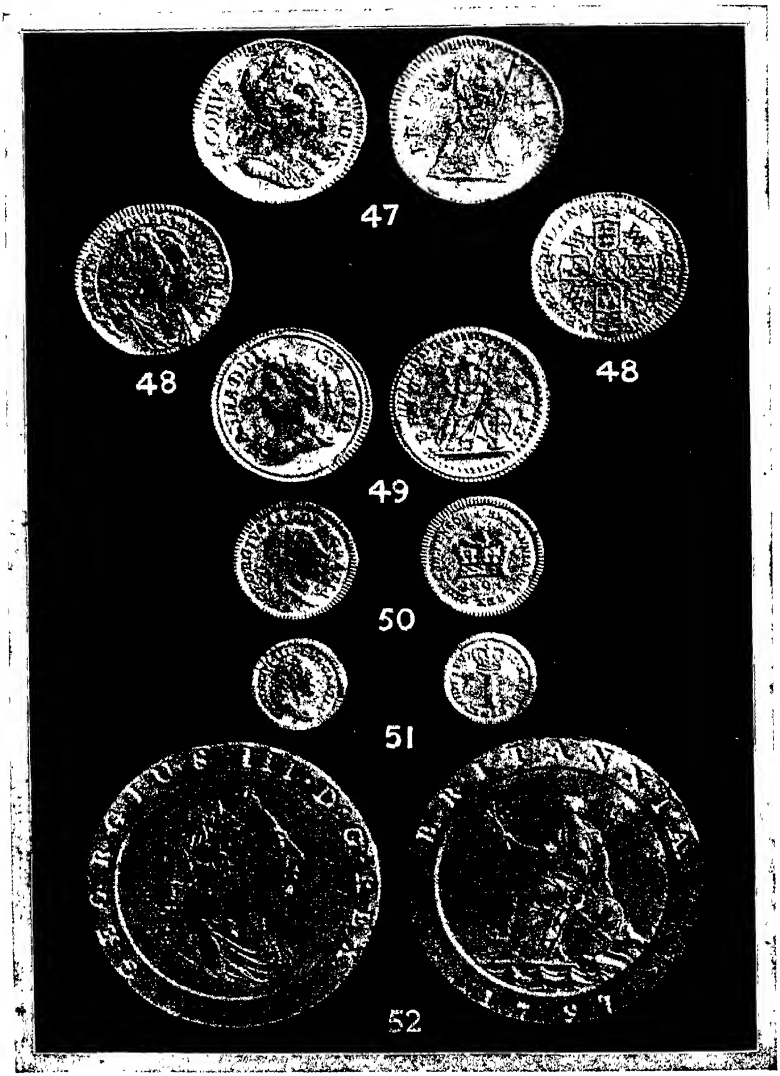
In this illustration the coin shown in Fig. 37 is of gold, the rest being of silver. Fig. 36 depicts an Oxford Crown of the time of Charles I.; Fig. 37 shows a ten-shilling piece from Colchester; Fig. 38, a Pontefract shilling; and Fig. 39, a half groat of the time of the Commonwealth. A groat was worth 4*d*. The coins shown here are slightly enlarged.

ENGLISH COINS: CHARLES II.



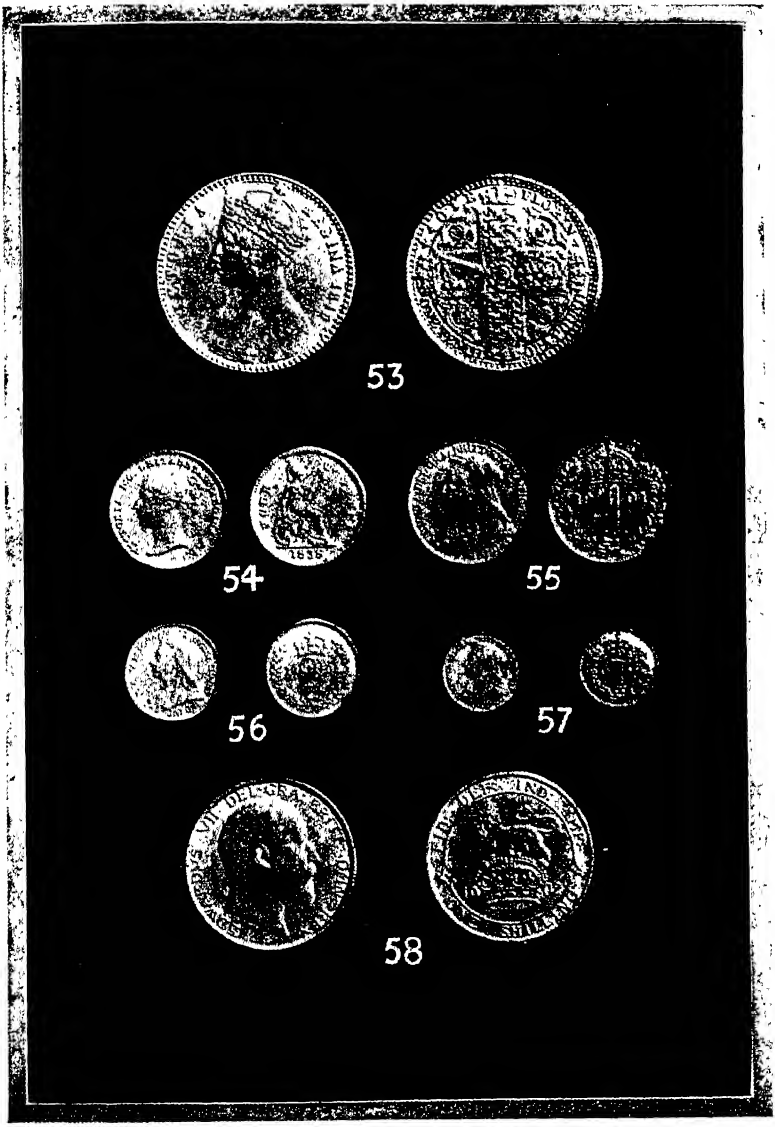
All these coins, except the first one (Fig. 40), are of the time of Charles II. The first one is from Commonwealth times. The large coins are gold, except the halfpenny shown in Fig. 42, and the small coins are copper. The two large gold coins were called "broads," and were twenty-shilling pieces. Each coin is shown rather larger than the actual size.

A MAUNDY PENNY

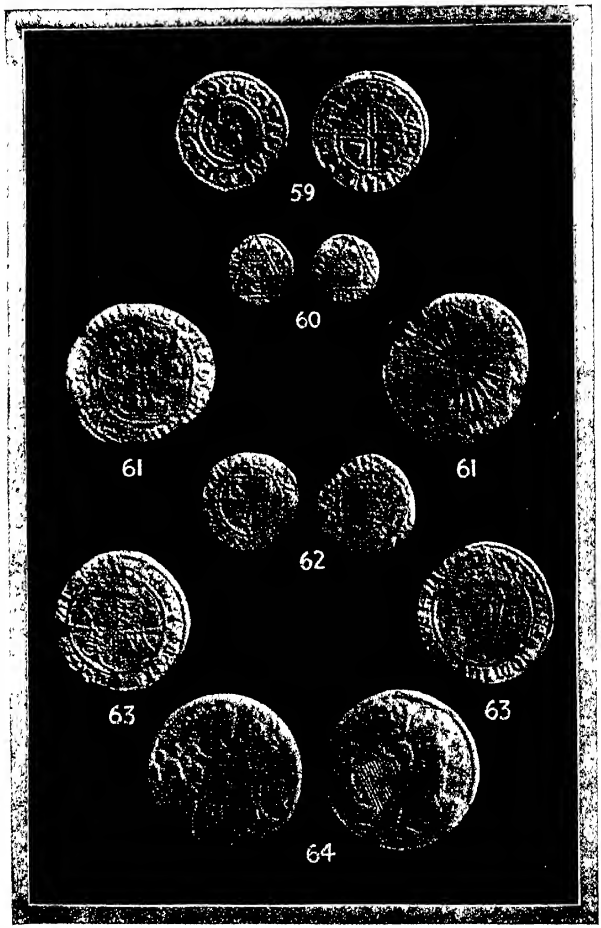


The copper twopenny piece (Fig. 52) was used in the time of George III. Fig. 47 shows a tin halfpenny of the time of James II.; Fig. 48, a William and Mary sixpence; Fig. 49, a Queen Anne farthing; Fig. 50, one-third guinea of George III.; and Fig. 51, a Maundy penny.

ENGLISH COINS OF RECENT TIMES



The silver coins shown here are all of recent date. The florin and the shilling are easily recognisable. The florin is of the time of Queen Victoria, in whose reign it was first issued. Fig. 57 illustrates a silver penny. Each coin is slightly enlarged.



IRISH COINS. (*Slight reduction.*)

In this illustration is shown a collection of old Irish coins varying in date from the tenth century (Fig. 59) to the seventeenth century (Fig. 64), which represents a halfpenny. The head on the halfpenny shown in Fig. 60 is said to be that of St. John the Baptist. These coins are all silver except that in Fig. 64, which is bronze.

Specially valuable coins, including those of gold, may well have a separate cabinet of their own, which can be entrusted to the further security of a safe. Coin cabinets are expensive things to buy—one may say, very expensive — so the young collector can use some of his time very profitably in constructing a cabinet for himself. If he is fortunate, he may be able to acquire second-hand a plain mahogany cabinet with locking door as a sightly shell for the more costly items, the trays, which will be many in number. Otherwise he will have to make the "cupboard" part to the best of his ability. The top and bottom of the cabinet should project sufficiently to be flush with the face of the door when closed, and be a very good fit, so as to exclude dust.

How to Make Trays.

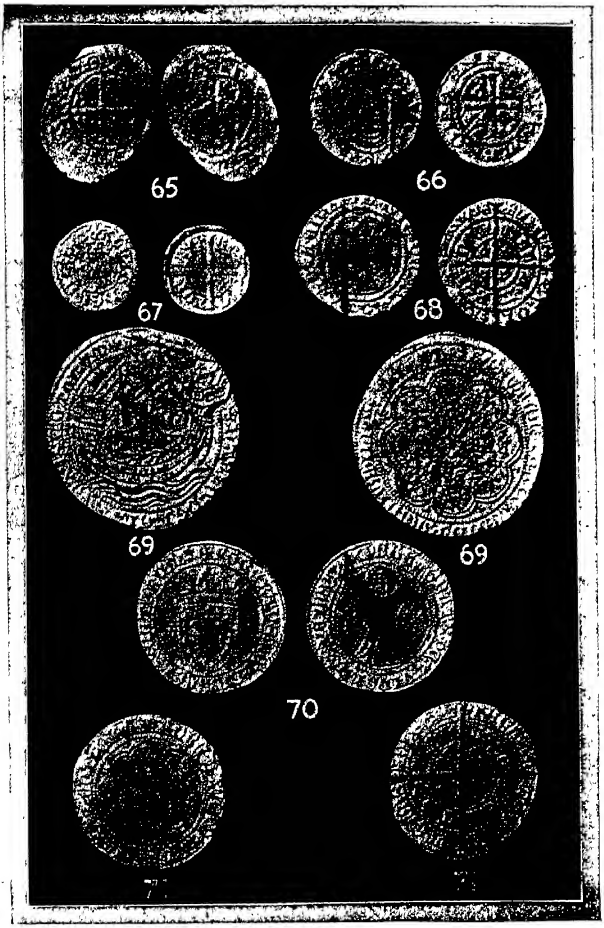
The trays themselves may be pieces of good quality $\frac{1}{4}$-inch plywood cut carefully to a standard size, which fit the inside of the cabinet closely, but not tightly, so that they may be pulled in and out easily. Round the edge of each tray on the top is glued flat beading, $\frac{3}{16}$ inch thick and $\frac{1}{4}$ to $\frac{5}{16}$ inch

wide. The interior of the tray is then divided up lengthwise and crosswise, by bars of the same material, into spaces large enough to hold a dozen or more coins apiece. The bottom of each space is then furnished with a loose lining of dark green facecloth—or, if odd scraps of the material can be got from a billiard-table maker, of billiard-table cloth — against which the coins will show up well.

Trays of this kind are suitable for displaying coins in groups or families, and make it easy to keep coins of all sizes together.

More elaborate trays, providing a separate space for each coin, can be made out of the same kind of plywood. A tray is ruled in both directions with lines parallel to the edges, the crossing points marking the centres of holes-to-be. In ruling, allowance must be made for keeping holes at least ½ inch away from any edge. The hole centres are then drilled with a small twist drill to guide the centrebits with which the holes are cut right through the tray.

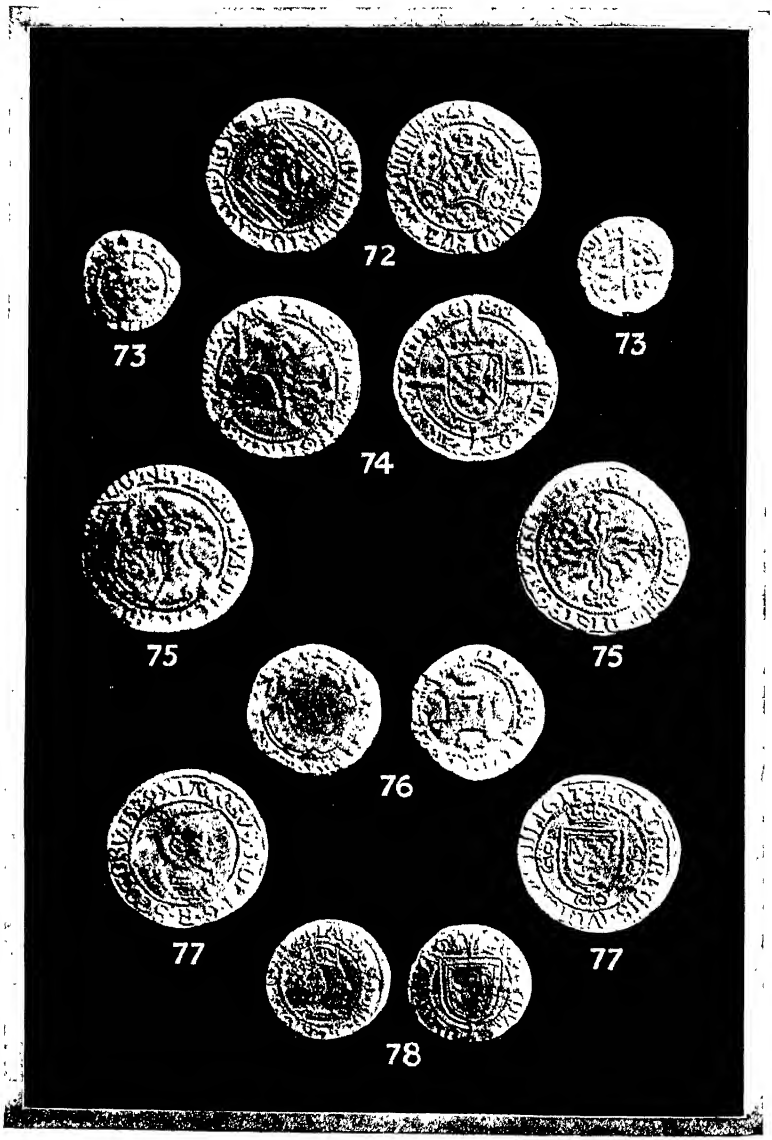
During this operation the tray should be clamped against a piece of waste



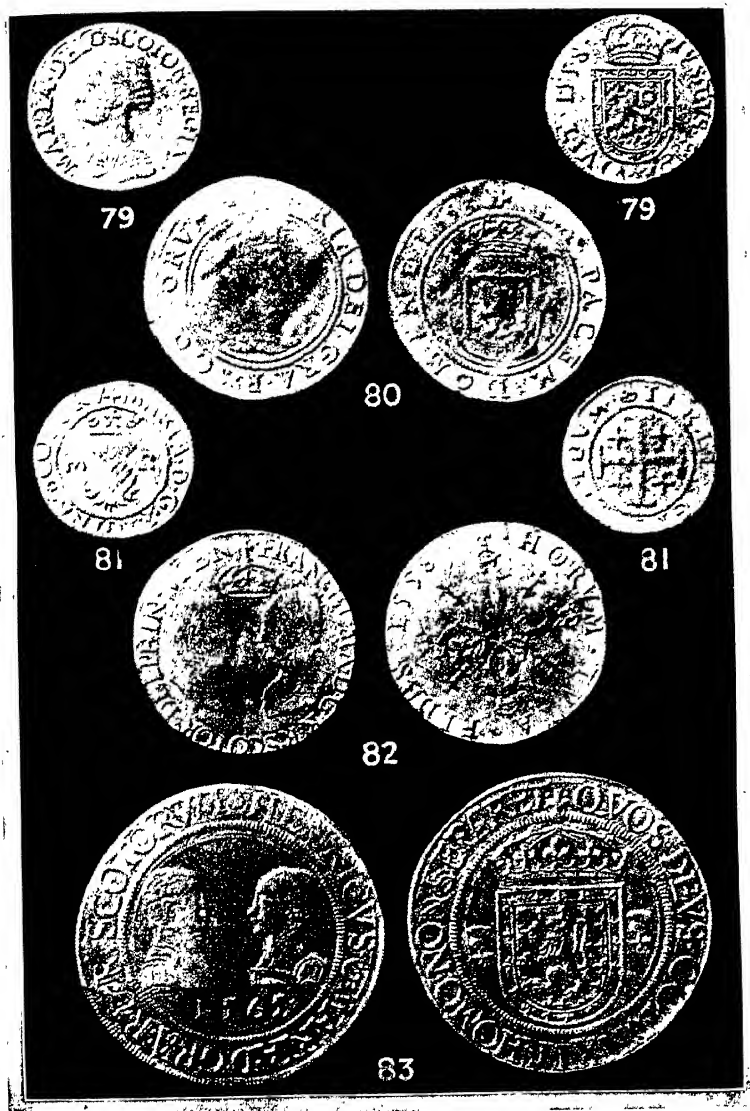
SCOTTISH COINS. (*Slight reduction.*)

The illustration shows a group of coins from Scotland. The fine gold coin in the middle of the photograph (Fig. 69) is a noble of the fourteenth century. Figs. 65 and 66 are early pennies; Fig. 67, a halfpenny; Fig. 68, a half groat of the same date as the noble; Fig. 70, St. Andrew; and Fig. 71, a groat.

A SCOTTISH BONNET-PIECE

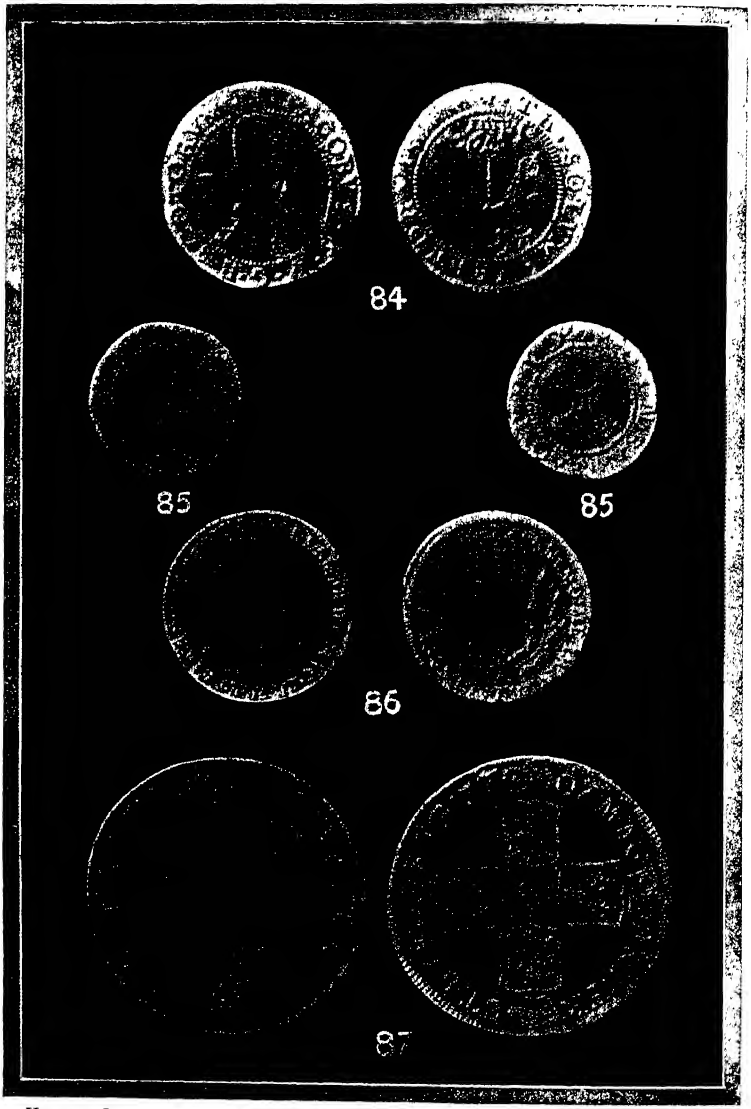


These Scottish coins have curious names. Fig. 72 shows a demy (3*s.* 4*d.*); Fig. 73, a penny; Fig. 74, a rider of gold (23*s.*); Fig. 75, a gold unicorn (the animal can be seen on the coin); Fig. 76, a plack (2*d.* or 3*d.*); Fig. 77, a ducat or bonnet-piece in gold, worth 40*s.*

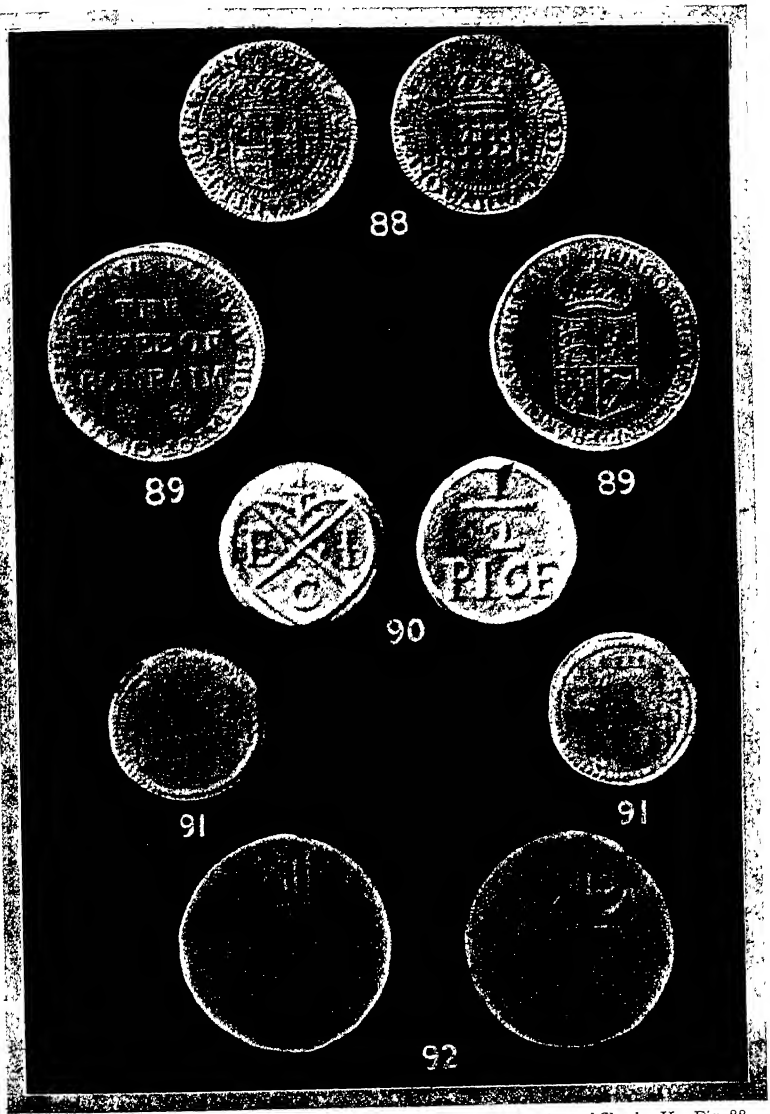


Another group of Scottish coins. Fig. 82 shows a ducat with the heads of Mary and Francis upon it, and Fig. 83 a Silver Ryal bearing the heads of Mary and Henry (Henry Darnley). Fig. 81 shows a bawbee a coin similar to the modern halfpenny. Fig. 79 shows a half-ryal.

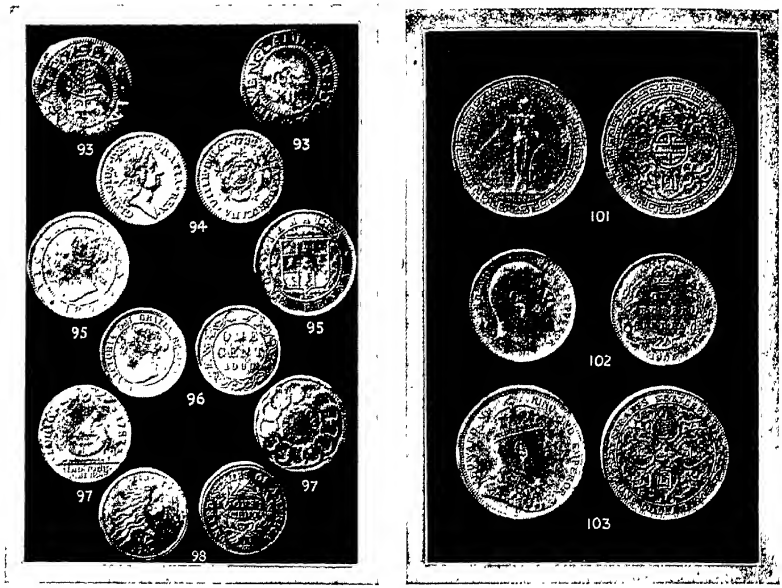
COINS OF JAMES VI. AND LATER



Here are Scottish coins dating from James VI. of Scotland, afterwards James I. of Great Britain. Fig. 84 shows a gold four-pound or hat-piece; Fig. 85, a plack; Fig. 86, a bawbee with the heads of William and Mary; and Fig. 87, a crown. The crown is of the time of Queen Anne, whose head appears on the coin. Each coin is shown slightly enlarged.



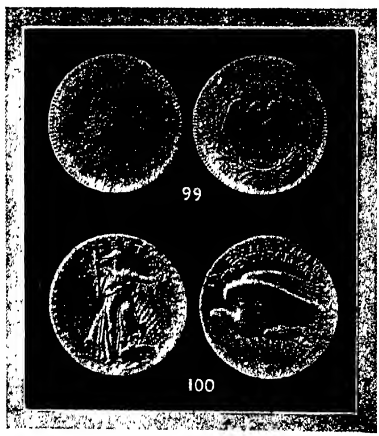
Here are some Colonial coins. The rupee shown in Fig. 89 is of the time of Charles II. Fig. 88 shows the oldest coin of the group, a portcullis sixpence of Elizabeth's time. Fig. 90 shows a half-pice coined by the East India Company; Fig. 91, a threepenny piece from the Sommers Islands; and Fig. 92, a New England shilling.



COLONIAL AND UNITED STATES COINS. (*Slight reduction.*)

These illustrations show a group of Colonial and United States coins. Notice the head of the woman, and the word Liberty on the coin shown in Fig. 98, a cent; Fig. 97 is also a cent; Fig. 96 shows a Canadian cent. Fig. 93 shows a seventeenth-century shilling from Massachusetts; Fig. 94, a halfpenny; and Fig. 95, a Jamaica penny. Fig. 101 shows a British dollar; Fig. 102, an Indian rupee; and Fig. 103, a Straits Settlements dollar.

wood, into which the bit may bite and so make a clean cut as it comes out through the back surface. The "nicker" of a bit—the point which cuts a circular groove slightly in advance of the sloping blade, or "router"—must be *sharp*, to obtain nice clean holes, and the cutting be done gently. A sheet of cardboard, or, better, very thin plywood



UNITED STATES COINS

Fig. 99.—A half dollar of 1795. Fig. 100.—A twenty-dollar piece (gold) of 1907.

(which can be obtained $\frac{1}{16}$ inch thick) is glued to the bottom of the tray, and kept under pressure for twenty-four hours; and each hole is furnished with a neatly fitting disc of green material.

Each tray should be carefully sandpapered on both sides, nicely stained, and provided with a small knob or other attachment in front by which it can be pulled out.



Studio Lisa.

GOING TO A NEW HOME

The terrier seen above in his travelling box is being taken from his mother and brothers and sisters so that he may be sent to a new home. This will be one of the greatest adventures of his life, and one wonders if he will be well but prudently fed, properly housed, regularly exercised and kept clean, because upon this will all his future happiness depend.

PETS FOR BOYS AND GIRLS

HAVE you ever wondered exactly why we should keep pets? Well, there are several reasons, of course; and you can, for instance, regard a pet as a sort of living toy, far more interesting and companionable than an ordinary toy could ever be. Going further, you may look upon your pets in the light of a hobby and pastime; whilst, in some forms, they may quite well help you to earn a little additional pocket money.

What most appeals to me, though, is that a pet is an individual creature with a character of its very own, to be looked after kindly, well-housed and properly fed, kept perfectly clean and happy. Attend carefully to these matters and the pet will become your friend, whilst the very faithfulness of, say a dog, for its young master or mistress is something very beautiful to behold.

The Responsibility of Pets.

But there's another important point and that is that pets bring with them a responsibility. They are creatures brought to play a part in home life and

so cannot fend for themselves as do their cousins who live under natural conditions. Our pets are all entirely dependent upon us. If you own a pet you must feed it regularly and prudently, neither giving too much nor too little food; see that it has fresh, pure water to drink and that its coat where necessary is groomed and its home kept scrupulously clean.

Now this sort of loving care and attention for our lowly friends, whether they be four-footed or otherwise, teaches girls and boys to be thoughtful and thorough, gentle and considerate, and you will discover before very long that the greater the attention you bestow upon your pets the more they will respond in displaying their affection for you.

In any event, the keeping of any form of livestock will occupy a great deal of time and you must be prepared occasionally to give up an outing or a game with your friends because just then your duty towards the pets is calling you. It is not the slightest use going in for birds or animals at all if you are likely to grow tired of them, leaving Mother to attend to the feeding and Dad to the cleaning of the hutches or cages. If you cannot, with patience and perseverance, manage your pets entirely by yourself, you should never start to keep them.

Now and again, of course, illness may crop up among pets. You may find your doggie's coat rough and he will not wish to have a romp; your cat may desire to sleep all the while and not care about her food; the eyes of your pet bird may be dull instead of bright and its plumage disturbed instead of smooth, though you will very soon get to know from various symptoms when your pet is not in first-class health.

About Pets' Clinics.

In such circumstances it would be wise at once to consult your parents because prompt attention might save pain to your pet or perhaps a serious illness. In most towns now there is at least one pets' clinic where children may take their animals and birds for skilled treatment in the case of sickness. Usually, no charge is made to children, though it is nice to put a few pennies into the collecting box in the office. In other districts there may be an animals' dispensary where a charge is made, but money is always wisely spent when it is used to alleviate suffering in the case of a dumb creature, and no pet ought ever to be allowed to linger in sickness without receiving correct treatment.

In some parts of the country there are young fanciers' societies, fur and feather clubs and so forth. It gives one tremendous encouragement to belong to such societies and to the junior sections of these clubs, because one can then learn so much about the animals in which one is



Studio Lisa.

A GOOD PET FOR A BOY

A terrier of this type should form an excellent pet for a boy, being active and alert, hardy and healthy, and always ready for a romp or a run.



Studio Lisa.

THE SIAMESE CAT

Cats of the Siamese breed are particularly faithful to their owners and almost dog-like in their devotion. The body colour is creamy with mask, ears, feet and tail a dark seal brown. The eyes of these pussies are usually a decided blue

interested and meet other girls and boys who have taken up the same kind of livestock. Further, there are very helpful shows or exhibitions and every opportunity is given for beginners to compete with their pets in what are termed the novices' classes.

Whatever pets you do take up be prepared to devote a certain part of every day regularly to their care and make up your mind you will never fail in your duty towards them. It is perfectly true that if, after a while, you put other pastimes to the fore and become neglectful of your pets then you certainly do not deserve to have the ownership of such friends.

Pets in A B C Order.

It will be wise, so that you can always refer at once to the sub-section in which you are most interested, if I set out the various home pets in alphabetical order. This being so, we can make a commencement with :—

BANTAMS, which are merely small fowls and therefore very suitable for children. There are many different varieties, such as the Rosecombs, English Game, Indian Game and Sebrights, but in town gardens one should keep for preference coloured birds, those that are perfectly white being better fitted for country life. As for making a start, the cheapest method is to purchase a setting of bantams' eggs and to place them in the care of a broody hen who will mother the chicks and bring them up. April and May are the two best months in which bantam chicks can be hatched and the period of incubation varies from 18 days to 21 days, according to the freshness of the eggs at the time of setting.

Housing. Though a small poultry house is to be recommended and will last for years with reasonable care, a large packing-case can be used to make a perfectly satisfactory home for a few bantams. The case should be turned on one side and have a brick at each corner to keep the woodwork up off the ground. The opening, where the lid was originally placed, may be boarded up afresh except for the provision of a door and one panel which may be formed of wire netting ; or, better still, of a small, hinged window. The window would be helpful because of ventilation,



Studio Lisa

A CAT-AND-DOG LIFE

If kitten and puppy are adopted together in the family they will grow up to be as happy with each other as this pair of pets obviously are.

but the opening would still have to be covered with netting to prevent the birds from escaping.

A run formed of wire netting on 2 inch by 2 inch wooden posts, with a door for the attendant, is advisable, and such a run can be kept sweet and wholesome if the soil is turned over with a garden fork about once a fortnight. Inside the roosting-place a strong perch about 18 inches above floor level should be provided, as well as a nest box with china egg. In the run a drinking fountain will be necessary and a day perch would be appreciated.

Feeding. Mixed poultry corn is too large for bantams in the ordinary way, though these birds can take wheat and oats. The best fare of all is probably "No. 2 Chick Food," such as corn-chandlers sell, consisting of small seeds, broken grain and dried insects. A well-mixed soft mash is also advisable, especially in the winter. Bantams should have one mash feed, one grain feed and one helping of fresh, tender greenstuff daily.

BUDGERIGARS are small members of the parrakeet family and may be obtained in many colours, blue, yellow, mauve, grey and so on, as well as in the familiar green of the old-fashioned "Love-Birds." Though a single specimen may be kept in a cage in the kitchen or living room and be perfectly happy, most people go in at least for a pair. These pretty little birds breed best in an aviary in the garden, but quite satisfactory results are obtained indoors when a specially large breeding-cage is provided. Usually five eggs are laid to form a clutch and the hen commences at once to set. The period of incubation is 18 days; but, as the hen begins when the first egg is laid and it is often a week before she has finished laying, the actual hatching period is sometimes prolonged.

Housing. Fancy cages, round in shape, are often used for budgerigars, whilst others are oblong. The chief point is to have a really roomy home and see it is kept out of direct draught. There should be plenty of bird sand on the floor and cleanliness is most important. An outdoor aviary should face the south and be enclosed on the north and east sides. Nesting boxes are placed on shelves high at the back.

Feeding. The staple food for budgerigars is millet seed, of which there are several varieties. In addition, green food is essential, and many fanciers sow ordinary canary seeds in potfuls of sandy soil in order to raise tender shoots. These pets should never be given meat, but tit-bits of biscuit and such fare in moderation are not likely to harm them.

CANARIES are perhaps the most popular of all cage birds, and have been

bred for so many years as home pets that they are perfectly happy living in cages—which certainly cannot be said of linnets, blackbirds, thrushes and other wildlings. Canaries are members of the large finch family, and they, too, thrive quite well in an aviary.

Autumn is the best time for the purchase of a canary because then the birds of the new season's hatching are just on the market. If possible, you should hear your bird sing, and he ought to be a young cock with smooth plumage, bright eyes and clean and delicate feet and legs. Roughened legs are usually a sign of age with all cage birds.

Housing. Though round wire cages are very popular, many fanciers prefer a cage that is oblong in shape. The floor must be sanded, but a great deal of trouble can be saved if a piece of paper is cut to fit the tray at the bottom and the sand sprinkled over it. If the living-room is illuminated with gas the canary's cage should not hang above the level of the burner.

Feeding. Canaries are fed chiefly on canary seed and rape, such as is sold in packets by cornchandlers. In addition they may have a little ripe fruit, greenstuff (especially groundsel, dandelion leaves, clover and the seed-heads of flowering grasses) and a piece of cuttle fish bone between the wires of the cage, or else a spray of millet sometimes for a change. See that the drinking water is changed every day.

To breed from canaries an unrelated cock and hen should be established late in March in a large breeding cage. After a week or two a nesting pan and nesting material (chopped wool, tow, etc., such as is sold at pet shops) must be provided. Four or five eggs are laid to form a clutch and the period of incubation is 14 days. Just before the chicks are due, begin giving hard-boiled egg finely minced and mixed with biscuit crumbs. The parent birds are left together all the time and will feed the youngsters on this special food. Not until the chicks can pick up seeds for themselves should they be established in a separate cage.

CATS have been kept as pets and also



Studio Lisa.

BROUGHT UP ON THE BOTTLE

When nannies are kept for their milk it very often happens that the kids have to be brought up on the bottle, as is here depicted. An ordinary glass bottle is used with a special rubber teat, and one would generally depend upon cow's milk for the purpose. Dipping one's finger into milk and getting the kid to suck it soon teaches these little animals how to feed.

for ridding our houses of mice for many centuries and were in Egypt regarded as sacred animals. We have to-day the long-haired cats (such as Persians); short-haired kinds and the quaint Siamese cats, which are very faithful and most interesting. Long-haired cats need frequent grooming with a soft, long-bristled brush, but it should seldom be necessary to use a comb unless the coat has been neglected and become tangled. Short-haired cats usually manage to keep themselves properly groomed. In the case of white cats, they may easily be cleaned as follows: Take some flaky bran and heat it in the oven. Rub this warm bran well into pussy's coat with your fingers and afterwards brush it out, when you will find the coat has become perfectly clean.



Studio Lisa.

BOTH GROOMING AND SPRING-CLEANING

If you go in for a dog he must be bathed occasionally and have a regular grooming, so that his coat may be healthy. His kennel will also call for frequent cleansing and fresh bedding.

Every cat (or kitten) should have its own bed and an ordinary grocery box answers the purpose very well, especially if you screw a small block of wood to each corner at the base just to keep the box up off the ground. Folded sheets of brown paper should be laid at the bottom of the box and then an old rug or blanket, also folded. Keep the box permanently in the same corner of the kitchen, out of draughts and never allow a cat (or any domestic pet, for that matter) to sleep in your bedroom.

Feeding. A kitten newly taken from its mother needs to be fed regularly every two hours just at first.



Studio Lisa.

BRINGING UP THE FAMILY

When first they leave their mother puppies must be fed every two hours, but be given only small helpings of food. These four puppies are thoroughly enjoying their ration of warm milk.

Warm bread and milk should be the chief food at this stage, with a little boiled fish, finely minced meat and such fare at least once a day.

A grown-up cat needs only two meals daily. Boiled cods' head with the flesh picked carefully from the bones; meat with a little green vegetable; bread and milk; boiled liver; the cheap tinned salmon; prepared food as sold by cornchandlers for puppies —these are all good for cats, but you must never allow pussy to become an eater of meat and nothing else. Potato food in large quantities is not good for cats.

Be sure to provide a cat (or kitten) with a proper sanitary box for the night. A shallow wooden box filled with a little garden soil and sifted fire ashes answers the purpose very well.

Dogs were probably the first animal friends man ever had, and there are to-day no fewer than ninety-four separate breeds. Very large dogs, such as Great Danes and Alsatians, are suitable only for life in a kennel; just as Cairns, Pekingese and Pomeranians are happiest living in the house as "members of the family." For boys, one would recommend active, sportive dogs such as Airedales, terriers of many kinds, Spaniels and so forth. Knowing little Dachshunds and Highland White or Scottish terriers are very companionable for girls. So far as Spaniels go, they do need a great deal of hard, regular exercise and these animals soon become fat and lazy if they spend too much of their time sitting in front of the fire or on soft cushions.

The actual choice of a breed must naturally depend chiefly on your own inclinations. If you have a kennel dog,



Fox Photos.

GOOD PETS FOR A GIRL

You will know of the Scottie, or Scottish Terrier, once named the Aberdeen, and he has two near kinsmen in the West Highland White (illustrated above) and the Cairns. All these dogs are sturdy, low to the ground and wonderfully intelligent. They are by no means too large to live in the house, and so make excellent pets for girls.

see that his home is kept scrupulously clean with plenty of fresh straw inside as bedding and a wooden platform outside on which he may sit in the sun and where his drinking water may be kept. See also that the chain is sufficiently lengthy and that your pet is not chained up for too long at a time. It is very easy to fix a stout wire along a fence or wall and to have a ring at the end of the dog's chain through which the wire may be passed. Such an arrangement ensures ample freedom.

Dogs and Cushions.

Every house dog should have its own box (much as recommended for cats) and not be allowed to use the chairs or cushions of the home, whilst it is bad for these pets to sit in front of a blazing fire. A small lap dog should have a circular basket.

Whatever sort of dog you keep, it must have regular exercise according to the breed and you must be willing to take it for a run before breakfast and last thing in the evening in any event. Always use a lead in the street; but try to find a field, park or some such place where your pet may have a scamper on the grass at least once a day. Never, however, exercise your dog immediately after a heavy meal. Swimming is excellent exercise, especially for spaniels and all such water-loving dogs. Rough-haired dogs and those with long coats require to be brushed and groomed.

Feeding. Puppies, just as they leave the mother, must be fed every two hours at first and given only small helpings—as much as they will clear up hungrily and no more. At six months three meals a day are ample and a grown-up dog needs but two.

Very young puppies may have warm gravy or warm milk, mixed with broken stale bread or else puppy biscuit; the prepared puppy food such as corn-chandlers sell; raw meat, finely shredded, three or four times a week; occasional well-cooked greenstuff and so on. A grown-up dog may have meat from the joint, cut up small, with green vegetables but not very much potato as one of his two meals. For the other, he should have "hard tack" for the sake of his teeth, such as dog biscuits or the crusts of stale brown bread. A large meat bone is good for a dog, but not the bones of poultry or rabbits.

Training. When training your dog be always firm and make him understand from the first that he has to do what you tell him. Do not scold him for a naughty action one day and be amused at him when he does it next time, for you must always be just. Whipping a dog is in no circumstances to be advised, nor is it likely to do the slightest good. A well-trained doggie knows by the tone of your voice when you are cross with him.

If you wish your pet to perform tricks, you must begin the lessons whilst he is still quite young and make up your mind to be very patient with him, never forgetting some little reward when he makes good progress. Standing the animal in a corner and teaching him to "beg" is probably the first and easiest trick of all to teach. Stamp out any tendency to cadge for scraps of food at table because a dog who so behaves quickly becomes a nuisance. In the same way, allow no "snacks" of food in between the normal meals and see that meal-times are strictly regular.

Your Dog Licence.

To keep a dog six months old and older it is necessary to take out a licence costing *7s. 6d.* a year and obtainable at most Post Offices. It is the owner who is licensed "to keep one dog" and so the licence itself is not transferable with a dog. Licences all date from January 1st in any year and are due for renewal on that date.

FOWLS can hardly be classed as pets, but they are full of interest and may be made most profitable. Girls and boys who begin with bantams often go on to keep fowls, and there are a great many



G. P. A.

THE GUINEA-PIG OR CAVY

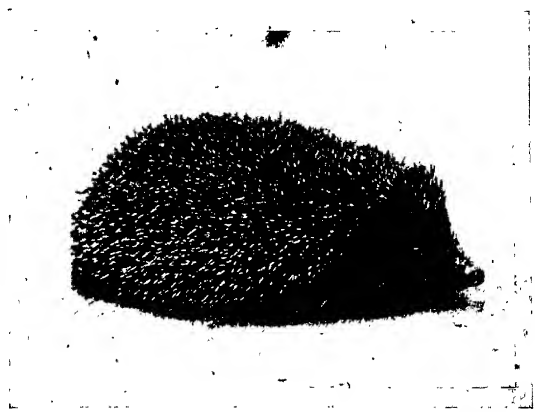
Guinea-pigs are quaint little pets, easy to manage and to feed when one has a large garden. They are quite defenceless and always gentle.

separate varieties though only two main groups.

In the first group we have the "general purpose" fowls, such as Rhode Island Reds, Orpingtons, Wyandottes, Sussex, Plymouth Rocks and so forth. With these breeds the hens make dependable mothers and the cockerels can be fattened to a good size for table. In the other group come the "light" breeds, such as Leghorns and Anconas. Here the cockerels never attain to a great size and the hens do not go broody. For children, however, Leghorns are probably the best breed of all to take up, White Leghorns in the country and birds with dark plumage for town gardens. Leghorns are small, active fowls but they lay remarkably well and their eggs are large.

If you decide to take up fowls you can begin in one of several ways. You can, in the autumn, purchase pullets (*i.e.*, young hens) and if you buy from a good poultry farm the birds will probably have been running over corn stubbles. You can buy day-old chicks in April and give them to a reliable broody hen to rear. Or you can buy a setting of eggs and slip them under a broody hen, the period of incubation being twenty-one days.

Housing. For your birds you will need a roosting-shed equipped with perches and nesting boxes and a run adjoining with sides and roof of wire netting. The best flooring for the shed would be plain earth rammed down firm and sprinkled with sifted ashes. The soil of the run should be turned over with a garden



G. P. A.

MR. PRICKLES, THE HEDGEHOG

If you make a point of feeding a hedgehog at the same regular time each evening with a saucerful of bread and milk he will come for his meal and get to know you.



L. E. A.

A LONG-HAIRED CAT

Persians and other pussies of this type need to have their coats brushed and groomed almost every day.

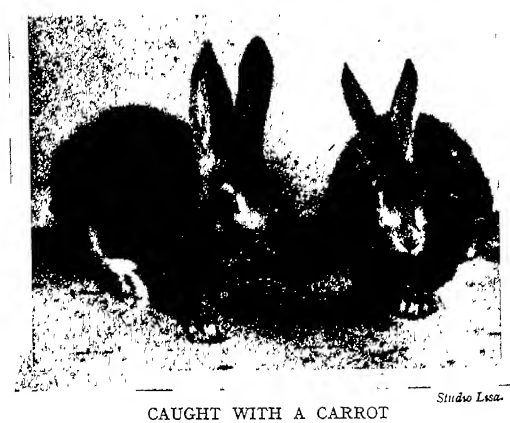
fork frequently, and it would be advisable to dig in a little lime every now and again. In an orchard or paddock a portable shed is best, one that can easily be moved by lifting and carrying, by pushing it along on its small wheels or else by means of sledge runners.

Feeding. In the ordinary way, grown-up fowls require feeding three times a day. In the winter the best breakfast would be one of warm, soft mash, with fresh greenstuff at mid-day and grain (oats, wheat and kibbled maize) about one-and-a-half hours before roosting time. In the summer the grain should be given for breakfast, the greenstuff as usual and the mash (cold) in the evening.

Soft mash is made from well-cooked house scraps, best flaky bran and middlings and a much smaller quantity of Sussex ground oats and meat meal. Potato fare is excellent for birds in the fattening shed, but is not advised for the layers in any great quantity. All fowls must be given crushed oyster shell and flint grit because it is with this material they grind up their food, having no teeth.

Baby chicks are fed for the first three days on hard-boiled egg minced up finely and mingled with the crumbs of stale bread or biscuit meal with just a sprinkling of pinhead oatmeal. After that they may have (small helpings every two hours) "No. 1 Chick Food," such as cornchandlers sell, consisting of small seeds, cracked grain and dried insects. Between two months and three months they have (at longer intervals) the "No. 2 Chick Food"; and, after that, much the same food as adult fowls.

GOATS are splendid pets for children living in the country, more especially when there is an orchard or paddock



Studio Lisa.

CAUGHT WITH A CARROT

These two bunnies seem quite unconcerned at being photographed, probably because of the carrot. Rabbits are most interesting pets and can be made very profitable.

available. The finest goats are the Toggenburg, from Switzerland, and the Nubian, which has long ears but not horns and is a large animal.

Goats may easily be taught to draw a small carriage for quite tiny children, but they are more often kept solely for their milk, which is specially good for babies and invalids, though it may be used for all sorts of household purposes. Goats are milked at strictly regular times twice a day and it is usual to stand the animal on a low wooden platform and for the milker to sit upon a stool.

From April until October nannies are generally tethered out-of-doors where there is rough pasturage, such as on the green verge beside a lane, in an orchard, on a common or some such place. A nanny would wear a heavy leather collar to which the tethering chain (some 10 feet in length) would be attached, the other end fastened to an iron pin driven into the ground. Tethered goats are moved to fresh positions two or three times during the day, according to the amount of herbage.

During the winter months the goats would live in a stable, being taken out for exercise only during favourable weather. As a rule, the stable door would be made in two parts so that the upper half could remain open on fine days, whilst hay is fed from a rack in one corner. In addition to green herbage and hay, milking goats require crushed oats, pieces of carrot, parsnip, swede or other root crop washed, chopped up small and served in a clean enamelled bowl. In the depth of winter a little cattle-cake is also given.

Goats require a daily grooming with a dandy brush and the parts must be carefully washed and dried (as must the hands of the attendant) before milking begins.

GOLDFISH can never be happy in a small circular bowl with the sun full in their eyes and nothing upon which to live but a few so-called "ants' eggs." To keep these pets with any real satisfaction a glass tank is essential; and, to maintain the correct balance of life, some water plants (obtainable from most pet shops) should be established in sandy shingle at the bottom and some ramshorn snails be provided as scavengers. Further, if the glass faces a sunny quarter it should have green paper pasted upon it or else have a little green paint brushed over the surface.

Fish will eat the leaves of many water plants, and other plants are said to be "oxygenating," which means that they produce air bubbles for the inmates to breathe. The snails prevent the greenish growth from forming on the glass, and in such a home fish will



Studio Lisa.

A SOLEMN-EYED SPANIEL

This faithful spaniel is obviously a "perfect dear," but an expert would say he is rather too fat and that a pampered life on soft cushions is harmful to him.

live happily for a great many years whilst the water scarcely ever needs changing. Generally speaking, one should allow a gallon of water for every inch of fish, not counting the tail. Thus, a tank containing four gallons of water would hold two fish each 2 inches in length, or four fish each 1 inch long. Overcrowding is a great mistake with these pets.

The best food of all is that specially prepared and sold in packets at pet shops. Ants' eggs are only for very large fish and meat is harmful. Bread is definitely inadvisable, more especially when it becomes stale in the water.

Epsom salts form the best medicine for goldfish that have been overfed and become sluggish. Many fanciers put half-a-teaspoonful of these salts into a small aquarium once a week.

GUINEA PIGS make excellent small pets and may be obtained in several varieties, Abyssinians, Peruvians and so on, chocolate and white, black and white, self-coloured and with various markings. The males are the "boars" and the females the "sows" and these animals live very happily in a large box, with hay on the floor as bedding and a small wire netting run attached in which they may feed.

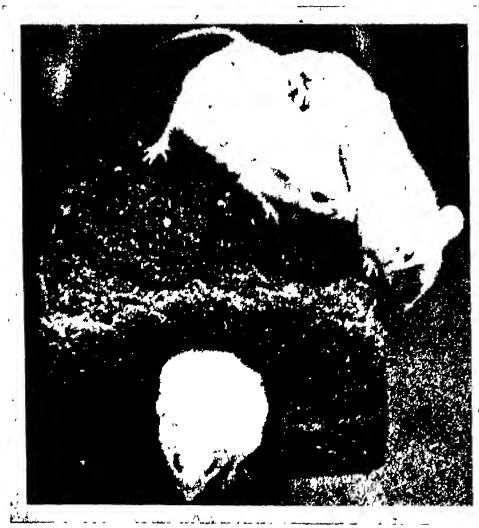
Feeding is a very simple matter, especially during the summer, when these pets may be given cabbage leaves, dandelions, sow-thistles, lettuce, cut clover, the foliage of artichokes and sunflowers and a great deal of other greenstuff from the garden. Whatever green food is given, however, it should always be dry and absolutely free from frost.

Bread and milk is particularly acceptable to "cavies" (as guinea-pigs are called) and for dry food they may have a mash made from one measure of bran and two measures of sharps or middlings. Another favourite dish is crushed oats mixed with a little chaff, but if oat food is given too freely, skin trouble may result.

Guinea-pigs require water to drink, and these pets must be kept specially clean.

HEDGEHOGS are really wildlings and one is most likely to see them in the dusk of the evening or after a shower. If you wish to take a hedgehog home and get it happily established in your garden, spread a duster or old handkerchief on the ground and roll the hedgehog into the middle. Now gather up the four corners and you can carry your captive quite easily.

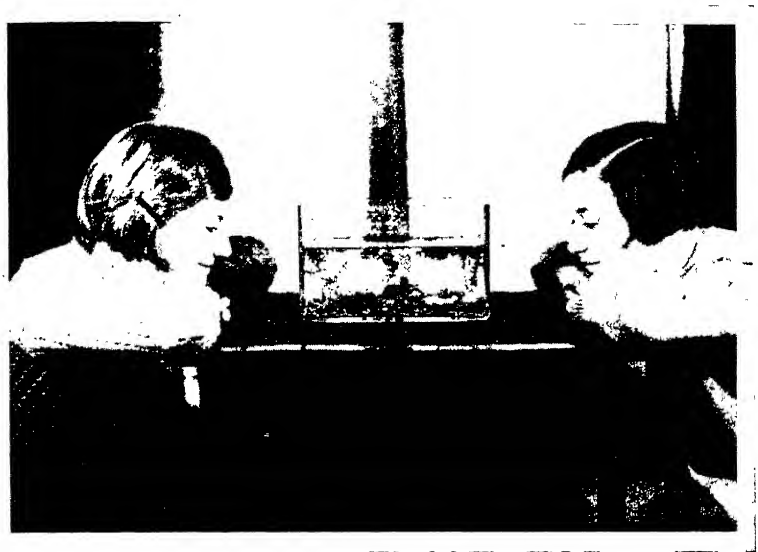
Hedgehogs are useful in the garden because of the pests they devour and they will clear a kitchen of black beetles. Bread



Fox Photos.

A TRIO OF "REX" MICE

These fancy mice were bred at a mouse farm in Essex and have a wonderful "wave" in their coats. They are very fond of brown bread and will make a home in the loaf after a meal.



WHAT AN AQUARIUM LOOKS LIKE

It is often cruel to keep goldfish in a small glass bowl, especially in the full sun. In a proper aquarium, however, these pets are perfectly happy and live for a great many years. Growing from the sandy bottom of the tank there should be selected water plants and a few ramshorn snails will act as scavengers.

and milk is the food they most appreciate, and if you feed your pet regularly at the same hour each evening he will turn up just as regularly for his supper. These animals hibernate during the winter.

MICE are available in many varieties, and all sorts of distinctive colourings and markings, interesting specimens being usually exhibited at various fur and feather shows. If you can make a start with an unrelated pair it will not be very long before you have quite a large stock.

Housing. Fancy mice are usually kept in boxes with plenty of clean sawdust on the floor, though peat moss is equally satisfactory. It is a good plan to have a glass front to each box so that the inmates may be watched.

Feeding. The sort of food to provide for fancy mice is: bread and milk; bird seed; crusts of stale bread; pieces of carrot or other root vegetable or of ripe apple; heads of flowering grasses or a piece of tender lettuce; crushed oats, very occasionally. Change of diet is important and no stale food must on any account be left in the hutches.

Young mice are taken away from their parents at four weeks, when the bucks must be separated from the does. The best method of picking up these pets is to take them firmly by the tail, fairly near the body.

PIGEONS are most interesting pets, especially those which one takes in a basket on a bicycle some distance away so that they may fly back home. For the garden Fantails are splendid, living in a cote which may be affixed to the top of a post, the cote being divided into separate compartments for each pair of birds. Homing and such pigeons, however, would not be happy in one of



Fox Photos.

A COCONUT FOR THE TITS

Tom-tits and others of their clan are winter visitors to our gardens. They enjoy coconut, peanuts threaded on strings and pieces of suet or other fat, or even a meat bone.

these cotes and so a " loft " is usually provided, which may be a special shed on the ground or even an attic at the top of the house. Where there is a loft the floor must be freely covered with rather coarse sandy gravel and perches provided for some breeds, whilst others have brackets shaped something like a letter V upside down.

You can make an excellent start with pigeons by buying a pair of unrelated birds from March to June. Put them together in a cube sugar box with a front of wire netting ; and, after a few days, provide a nesting pan (from a cornchandler or china stores) and some straw cut up into short lengths. Presently the birds will complete a rough nest and probably an egg will be laid one afternoon and another the next morning, two eggs forming a " clutch." The parents will set in turn and the period of incubation is eighteen days.

Feeding. Generally speaking, it is only necessary to buy a grain mixture from the cornchandler made up according to the breed of bird and time of year. The birds are fed twice a day, morning and evening, and it is most important to see that the drinking water is always pure. In favourable weather, pigeons should be given an enamelled bowl of clean water daily in which to bath.

RABBITS are always most popular as pets, and girls are particularly fond of Angoras with their long wool and pretty tufted ears. Our biggest domestic rabbits are Flemish Giants and Belgian Hares. Dutch and Old English are a good deal smaller, but the Lop-eared is rather a large animal. Beverens, Chinchillas and Havanas are kept for their pelts or skins.

Housing. The size of hutch for one's rabbits depends entirely on the breed, but there should always be plenty of space for the animal to turn round as it will get no other exercise. Usually, a hutch 26 inches in length, 18 inches in height and about 18 inches deep will answer one's purpose and be very easily made from an old box.

Grown-up rabbits do not live peacefully together so there must be a separate hutch for each adult and it is wise to partition off about one-third of the hutch to form an inner or sleeping compartment. Here, soft sweet hay is provided for bedding ; whilst, in the outer section, the floor has to be littered freely with clean sawdust or else peat moss. With many rabbits, the hutches may be built up in tiers one above the other so long as there are strips of wood between every pair of hutches.

Feeding. This must depend to a great extent upon the time of year and damp frosted greenstuff is fatal to these pets, as is the foliage of ivy, privet and other evergreens. One may, broadly speaking, give any of the following foods to rabbits, and change of diet is beneficial : Dry, tender greenstuff from the garden ; soft, sweet hay or else clover hay, which is harder ; mashes made from best flaky bran with strained tea-leaves, or crushed oats with a little chaff, or well-cooked potatoes (or parings) with barley meal or middlings or one measure of bran and two measures of middlings ; crusts of stale bread, perhaps just

"crisped" in the oven; pieces of carrots, parsnips or swedes, free from frost, washed and then cut up; pieces of ripe apple; bread and milk and the special food sold for rabbits by cornchandlers.

Young rabbits are taken from their mother when about six weeks old, but are left a little longer in cold weather. If you have occasion to lift a rabbit by the ears always support the weight of the animal's body in the other hand. The wool of Angora rabbits is clipped with round-ended or nurse's scissors when 3 inches long, half-an-inch of wool being always left on the animal.

RATS, like mice, are available with many different markings and colourings and the white ones with pink eyes are popular. They are usually established in hutches with glass fronts and it is most important that they are kept absolutely clean. One buck may run with two does, but the young ones should be separated from their parents at about six weeks, the bucks being then parted from the does.

Feeding. For fancy rats, bread and milk is quite a staple dish. One may give also boiled rice; hard bread crusts; pieces of carrot or ripe apple; seed heads of grasses and dandelion leaves, but very little corn or oats.

Lettuce and Mulberry.

SILKWORMS are of the greatest interest and a start should be made in early April by purchasing some eggs from the nearest pet shop. The eggs are then placed in a ventilated cardboard box and before long, caterpillars will hatch and need to be fed at first on fresh lettuce leaves; and, later on, with mulberry leaves, though these are usually not available until May.

Keep the box very clean, the best plan being to cut a piece of white paper exactly to fit the bottom of the silkworms' home. If ever you have occasion to pick up a caterpillar do so with a small camelhair brush and never with the fingers.

The caterpillars will grow to a considerable size, with occasional changes of coat, and eventually commence to spin silk and form their cocoons. It is when this stage has been completed that one may wind the silk, and small winders are sold quite cheaply at most pet stores and some toy shops.

Our Garden Wildlings.

TOM-TITS count among the wildlings and are frequent visitors to our gardens during the winter months. They enjoy particularly half a coconut suspended by string from the branch of a tree or a convenient piece of wood and are equally partial to a chain of pea-nuts threaded on twine and hung beneath a verandah. Even a meat bone or piece of suet conveniently suspended will attract these little birds, who cling upside down and in all sorts of queer positions as they feed.

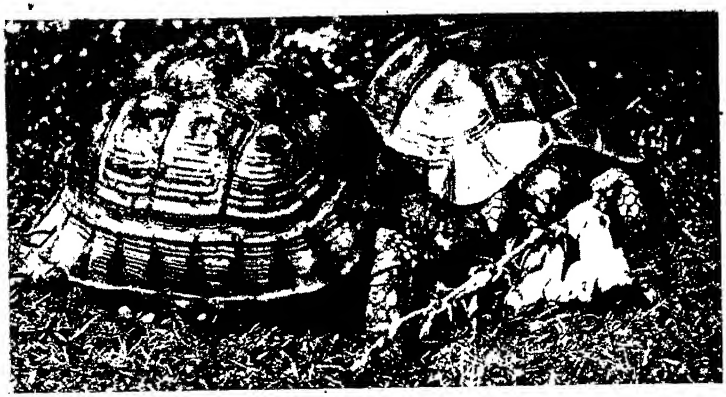
For ordinary wild birds, a table consisting of a flat piece of wood on a stout pole answers splendidly. Some birds like crumbs, meaty tit-bits, meal worms and so forth, whilst others will take seed. All are keen to have drinking water, especially in frosty weather.



Studio Lisa.

FANTAILS ON THEIR GARDEN HOME

Fantail pigeons are specially suited to life in a cote in the garden, and this particular cote is of most ingenious construction.



Fox Photos.

TORTOISES WILL EAT FLOWERS

These tortoises have high-domed backs and are of the land variety. Though they enjoy warm bread and milk, they are by nature vegetarians, and their food usually consists of lettuce leaves, dandelion foliage and similar fare. At the same time, they are quite partial to flowers.

TORTOISES are, of course, reptiles, and there are two sorts commonly kept as pets. The first is the Land Tortoise, with rather a high domed back, and the second the Pond or Water Tortoise, whose shell is much lower and who may have his hind feet webbed like those of a duck.

A Home for a Tortoise.

Housing. Owing to their habit of wandering and their propensity for tender seedlings in the garden it is wise to have a box turned on its side as a home for a land tortoise. A little hay may be placed in the box as bedding and one should build round it a pen of narrow wire netting attached with tarred string to upright bamboo rods. Such a pen is very easily movable.

Water tortoises are happiest when there is a shallow pond in the garden; and, where necessary, it is worth while to make one specially by sinking a shallow metal bath or some such receptacle in the ground.

Feeding. Both types of tortoise find a saucer of bread and milk acceptable. The land tortoise is, however, a strict vegetarian and will enjoy mostly fresh lettuce, dandelion leaves, cut clover, sunflower foliage and similar fare. Water tortoises live entirely on small worms, grubs, slugs and insects.

These pets hibernate or sleep away the winter, the land variety digging holes and burying themselves, whilst their water cousins prefer the mud of a pond. When a tortoise fails to hibernate naturally it should, towards the end of September, be placed in the middle of a deep wooden box packed round with leaves, hay and straw and put away in a cool shed or cellar until the spring. Even then, when first it wakens, it will need to be kept in a warm place by night.

After Hibernation.

Another point is that after the winter's sleep your tortoise may have his lips and eyes encrusted with saliva. If this happens bathe twice a day until the trouble has been removed, using a swab of cotton wool dipped in warm water with a little boracic powder.



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THE FASCINATION OF MODEL AEROPLANES

Ever since there have been aeroplanes in the skies models have been cleverly constructed and flown not only by boys but by girls as well, and this is now one of the recognised hobbies. In the picture above we are shown some members of the Rotherham Model Flying Club. A competition has just been held and everyone is taking an interest in the winning models.

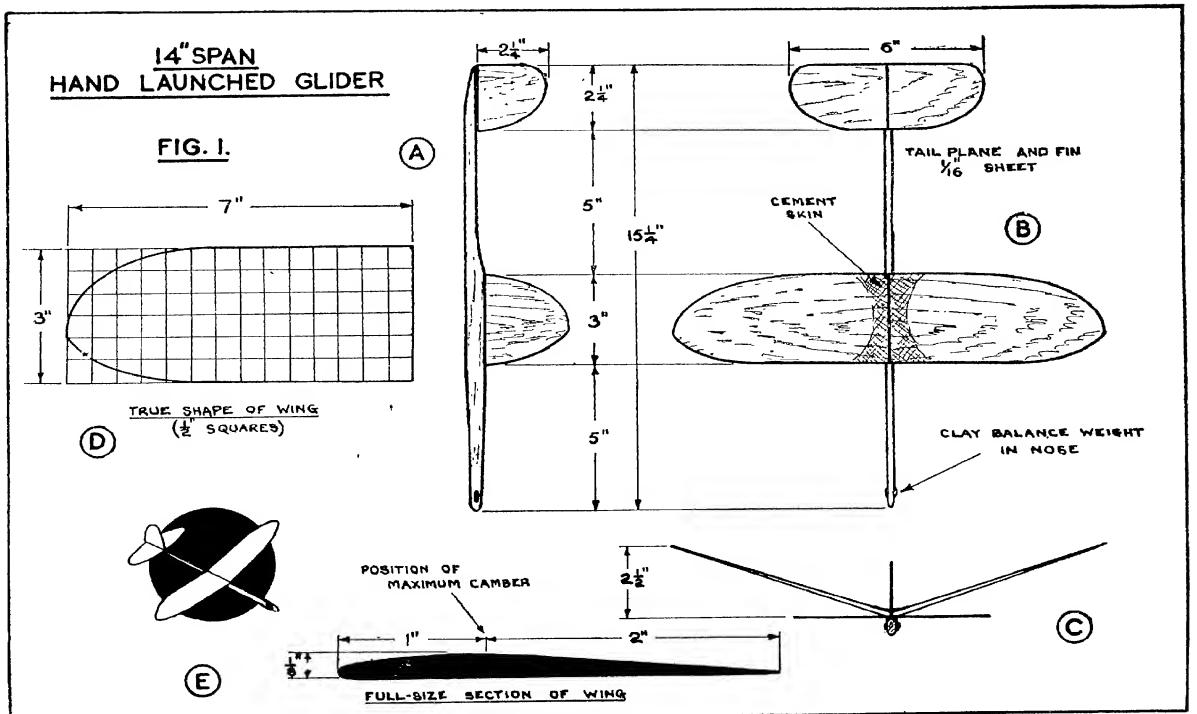
A 14-INCH SPAN GLIDER

THIS little glider is very easy to construct, needing but a small amount of material and few tools; yet, if made according to the directions, it will prove an excellent flier. All the material required may be bought from a shop dealing in model aero supplies.

The materials needed are these: A strip of $\frac{1}{2}$-inch by $\frac{1}{8}$-inch spruce or pine for the fuselage; some $\frac{1}{8}$-inch sheet balsa wood for the wings; some $\frac{1}{16}$-inch sheet balsa for the tail surfaces and a tube of balsa cement for making the joints. You can do most of the work with a razor blade and a sheet each of M2 and F2 glasspaper, although a small drill and saw would prove useful. Choose a razor blade of the type that has a stiffening piece over one edge. If you use the double-edged type you must fix it in a holder to stiffen it and protect your hand.

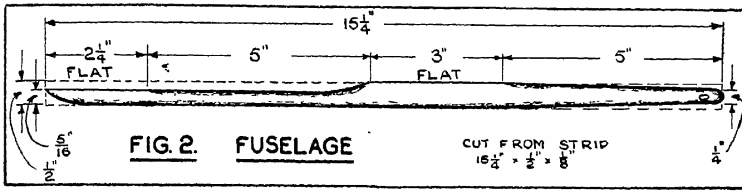
The main sizes of the model are shown in Fig. 1, from which you will see that the slender fuselage projects some way in front of the wings and has a balance weight in the nose. The wings have plenty of dihedral (*i.e.*, slope upwards and outwards, Fig. 1c) which makes for stability.

Start with the fuselage. Make sure that your piece of $\frac{1}{2}$-inch by $\frac{1}{8}$-inch strip is straight, and cut it to a length of $15\frac{1}{4}$ inches. Put marks at the points shown in Fig. 2. Taper the nose as shown and thin down the part aft of the wing position to $\frac{5}{16}$-inch deep. With your glasspaper round off all the corners



DIAGRAMS REQUIRED FOR THE SPAN GLIDER

The diagrams above, Figs. 1A, 1B, 1C, 1D and 1E give the main sizes of this interesting model. Most of the work can be carried out with an old razor blade (properly stiffened to protect the hand) and glasspaper of the right grade.



When making this model a start should be made with the fuselage, using a straight strip.

thoroughly, except for the two surfaces where the wings and tail plane are to be attached. Drill a hole about $\frac{3}{16}$-inch diameter through the nose. Aim at getting the wood as smooth and free from unevenness as possible. To do this, use the coarser glasspaper to work the wood to shape and the finer grade to smooth its surface.

The wings are made from $\frac{1}{8}$-inch sheet balsa. If you have any choice of wood, pick the harder wood for the wings and a softer grade for the tail. Mark out the two wings as shown in Fig. 1D. If you draw $\frac{1}{2}$-inch squares on the wood and follow the sketch you should get the shape correct. Make both wings exactly alike. If you cut away from the line on one, trim up the other to match it. Notice that the point of the wing tip is 1 inch back from the leading edge. This position is important later when balancing the finished model.

Smoothing the Surfaces.

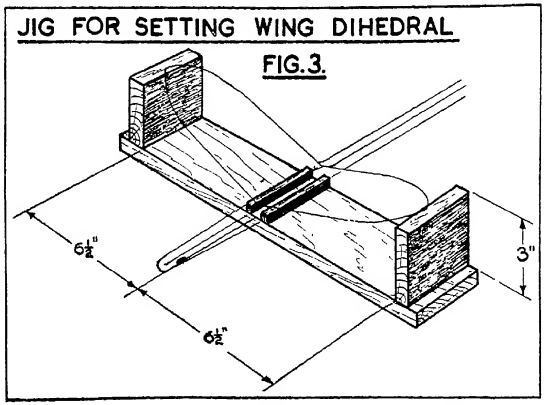
Next, carefully rub the wings down to the section shown in Fig. 1E, tapering the thickness towards the wing tip. The shape of this section is important as on its accuracy depend the flying qualities of your model. Draw a line along the top surface 1 inch back from the leading edge. This marks the thickest part of the wing, and you must work down from this each way, tapering to a thin edge at the rear and a thicker rounded edge at the front. The under-surface is kept flat. Finish off by making all the surfaces as smooth as possible.

To locate accurately the wings on the fuselage you require a jig (Fig. 3). This is merely a support for the wings and fuselage to hold them while they are glued. It need only be quite roughly made, provided there are a couple of blocks in the middle to hold the fuselage upright and two blocks 3 inches high 6½ inches each side of the centre to hold the wings at the correct dihedral.

Fix the fuselage on the jig and rest the wings in position. You will see that the meeting ends of the wings need bevelling so that they rest against each other closely. To do this accurately, estimate the amount of bevel necessary, then rest the end of the wing over the edge of a table and work the bevel on it, using a piece of glasspaper wrapped round a flat block of wood. Do not try to do it with loose glasspaper held in the hand or you will spoil the work.

Before joining the parts together give the ends of the balsa wood wings a coating of balsa cement and allow it to dry. Then put the parts together with plenty of cement in the joint so that it forces out as the parts are pressed together. Leave the job an hour or so to set and then give the top surfaces round the joint another coating of cement to form a strengthening skin (Fig. 1B).

While this is setting you can make the tail plane and fin. Use $\frac{1}{16}$-inch balsa and cut it to the outline shown (Figs. 1A and 1B). The exact shape is not so important as on wings, but try to get smooth curves and the two sides of the tail plane exactly alike. It is a good plan to cut a piece of cardboard to one of the curves and use it as a template for marking all three of them. Round off edges most carefully and smooth the surfaces.



The object of the jig is to locate the wings accurately.

Cement the fin centrally on the tail plane, taking care that it is kept upright and not warped. Next, cement the whole tail unit to the fuselage, being careful to keep it true in relation to the wings. When you sight along the fuselage it should look like Fig. 1c.

Give the cement a chance to harden thoroughly by leaving the model overnight. Smooth it off with worn-out fine glasspaper and polish it all over. This may be done by lightly rubbing it with furniture polish, or by giving it several coats of model aeroplane dope, rubbing each coat smooth before applying the next. The perfect smoothness of its skin makes a lot of difference to the results you will get from your model.

Finally, before the glider is ready for its first trials, it has to be balanced. This is done by putting clay in the hole at the nose, adjusting the amount until the glider exactly balances when held lightly by a finger under the point of each wing tip. You may have to enlarge the hole to get sufficient clay in. This is best done by working it into an oval shape with a round file.

For the first flight test hold the glider between the finger and thumb just below the wing, and launch it by throwing it gently forward parallel to the ground. Watch its behaviour carefully. If it dives at a steep angle the nose is too heavy. If it drops its tail after it leaves your hand the weight is not sufficient. When you have adjusted the weight so that the model glides smoothly at a shallow angle try hurling it into the air. Throw it upwards at a fairly steep angle. At the top of the throw the model should turn and roll, then settle into a steady glide. With a little practice you will be able to throw it to quite a good height, from which it will glide to earth in a most realistic manner.



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AN EXCITING CONTEST WITH MODEL AEROPLANES

In this picture members of the Yeovil and District Model Aeroplane Club are holding one of their interesting field events. The well-made models represent popular types of modern planes.

A 21-INCH SPAN RUBBER-DRIVEN AEROPLANE

THIS model, of the flying stick type, represents the simplest possible design of a flying model and is suitable for the beginner in aero-modelling. Despite its simplicity of construction it is quite a good flier, capable of flights of over a minute.

As you will see from Fig. 1, the fuselage is a square-sectioned stick, to which the other parts are fitted. The wire undercarriage is bent up to form skids which take the place of wheels, serving the purpose just as well and representing a saving in weight. The wing and tail unit are built up of balsa wood and covered with tissue. The list of materials at the end of this article gives the sizes of each part, the material from which it is made, and also its correct name. It is worth while memorising these names as they are the same for a model as for a full-size aeroplane.

All of the material may be purchased from a model shop. The propeller may be bought ready-made or partly finished, or you can carve your own. For a first attempt, however, it will probably be advisable to buy a ready-made propeller, reserving your attempts at carving one until you have gained some further experience.

Start with the fuselage (A), checking that the piece of wood is straight, and then making it smooth with glasspaper. Mark out the position of the slots for the undercarriage and cut them with a small saw, making these cuts very shallow. They need only be barely deep enough to take the wire (Fig. 2). The safest way to cut them is to draw the saw backwards across the line two or three times.

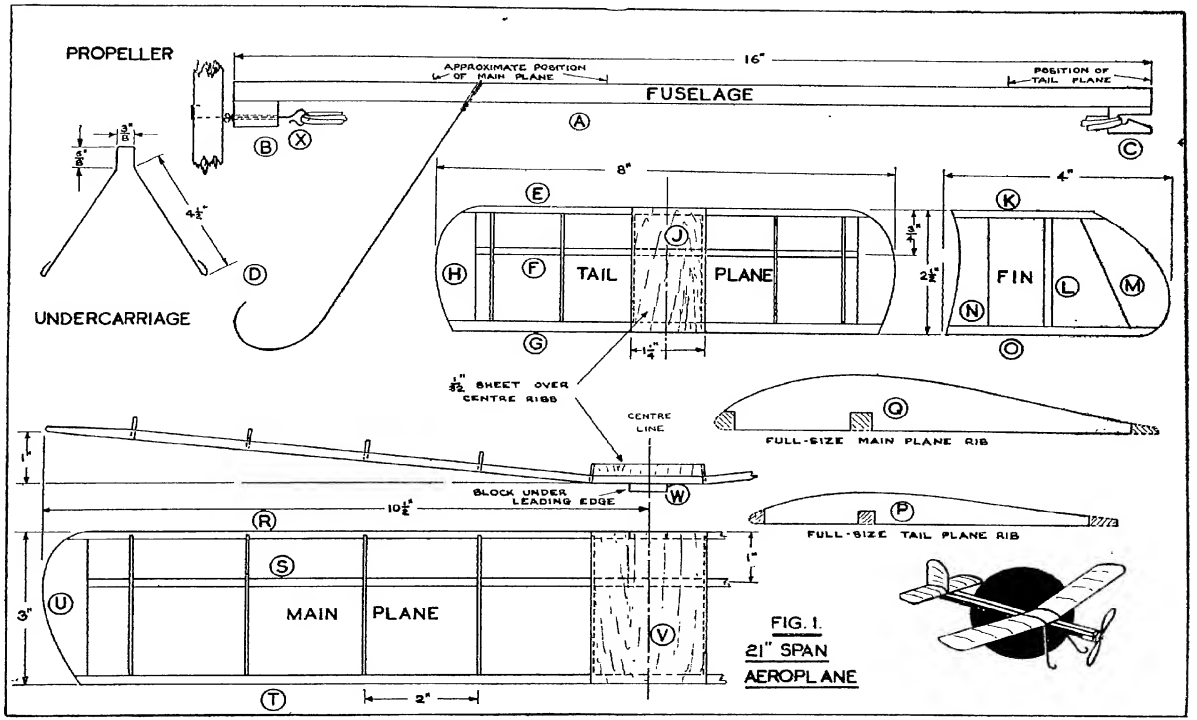
To make the tail skid (C) drill the hole and cut the slot before you reduce the piece to length, for then you will have sufficient wood to hold while working. The nose block (B) has to be drilled accurately to take the propeller axle. You can make a bradawl for drilling this out of a piece of the same wire as the axle, filed to a flat point at one end and fixed in a block of wood for a handle (Fig. 4). Glue blocks (B and C) to the fuselage with any good quality tube glue. All other joints in this model are made with balsa cement, which is particularly satisfactory for balsa wood, but is not suitable for the harder material used for the fuselage parts.

Making Fin and Planes.

Before commencing to make the tail plane, fin and main plane, draw them full-size on a piece of paper fixed on a flat board. The drawings need not be very detailed, so long as you show the overall sizes and the position of each part.

Start with the fin, which is simplest of these three parts. Cut parts L, M and N accurately to shape with a razor blade. The leading and trailing edges K and O should be left a little on the long side. Lay the parts on the drawing, coat the joints with cement and press them together, holding them with pins pressed into the board (Fig. 3). When the cement has set, trim the ends of parts K and O to shape and smooth the fin all over with glasspaper, slightly rounding the outer edges except the bottom, which will later be cemented to the tail plane. If the wood sticks to the drawing, it may be lifted by sliding a razor blade between wood and paper.

Cut one tail plane rib to the full-size drawing (P) and use it as a template for marking out five more. Cut the slot to fit snugly over the strip you have selected for the spar (F). Cut the tail plane tips (H) together so that they are exactly alike and make sure that they and the ribs are all of the same length. Cut the spar exactly to length, but allow a little extra on the ends of the leading and trailing edges (E and G). Place the spar (F) in place on the drawing and cement the ribs to it. Then cement the leading and trailing edges, cramping



COMPOSITE DIAGRAMS FOR THE RUBBER-DRIVEN AEROPLANE

This model, which has a span of 21 inches, is easily made with the aid of these pictures, which run from 1A to 1X. This is the simplest possible design for a real flying model and is quite suitable for a beginner to undertake.

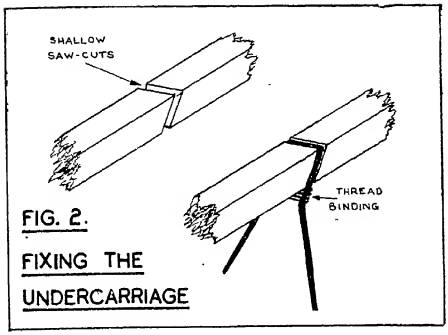


FIG. 2.

FIXING THE UNDERCARRIAGE

The safest way to make these cuts is to draw the saw backwards across the line.

them with pins in exactly the same way as you did the fin. Add the tips (H) and leave the cement to dry. When it has set, clean the structure up with glasspaper, paying particular attention to the smoothness of the curve over the tops of the ribs. Cut a piece of $\frac{1}{32}$-inch sheet balsa to fit over the tops of the two centre ribs and cement it in position, weighting it if necessary while the cement sets.

The wing, or main plane, is made up of three parts: two outer planes and a centre section. The joints are made at the two ribs each side of the centre-line. Cut the ribs in the same way as for the tail plane, using the first one (Q) to mark out the other nine. First form the two outer planes, building them up and cramping them with pins as you did the tail plane. Be careful to make a pair and not two of the same way. After they have set, cut the inner ends of pieces R, S and T flush with the inner ribs.

Cut the parts of pieces R, S and T which form the centre section 2 inches long and bevel their ends slightly. You can get this bevel accurately if you place each strip in turn over the front view of the centre section in Fig. 1 and cut straight down with a razor blade over the line of the rib.

Making the Jig.

So that you can get the main plane correctly assembled with equal dihedral at each side, build up a simple jig, similar to the one described for the 14-inch glider, in the following way: On a flat board, draw two lines $20\frac{1}{2}$ inches apart and another midway between them. Stand two blocks 1 inch high against the outer lines. Cement the three strips forming the centre section in place between the two outer planes, while they are resting on the jig. Arrange the parts so that the wing tips are resting on the blocks at the ends of the jig and the centre section is set equally on each side of the centre-line. Use plenty of cement at the centre section joints and cramp the wing to the jig with pins. Cement a piece of $\frac{1}{32}$-inch sheet over the centre ribs, but do not, at this stage, fix piece W.

When all parts have been smoothed and their edges rounded, they are ready for covering with tissue, which is fixed with ordinary paste. Do not attempt to cover, say, the whole wing

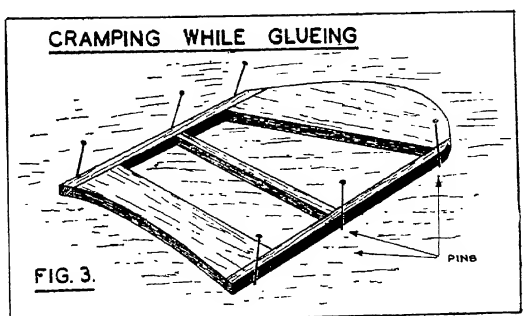
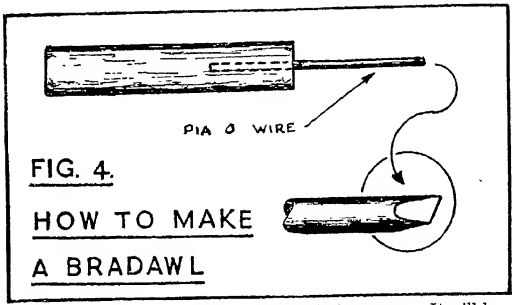


FIG. 3.

When the joints have been coated with cement and pressed together, use pins to hold them.



This home-made bradawl is formed of piano wire. It will be useful for most modelling.

with one piece of tissue, but use one piece over the top and bottom of each outer plane and one piece round the centre section. Cut each piece with a little overlap, then cover the wood with paste and fix the tissue in position, keeping it as tight and smooth as possible, although there is no need to strain it too hard, as the final tightening will be carried out by steaming and doping.

Allow the paste to dry thoroughly, this taking about twenty-four hours. Then pass each tissue-covered surface through a jet of steam coming from a kettle. The purpose of this is to moisten the paper, but it must not be saturated, so you ought not to allow the steam to play too long on the paper. Put the parts aside; and when they have dried, you will find that the paper has become drum-tight. The paper could be left like this, but in damp weather you might find that it would become limp, so to waterproof it you must give it a coat of clear dope. This is applied with a brush, going over each part once only and not attempting to work the dope into the paper.

The piano wire used for the undercarriage and propeller axle is very hard springy steel, but it can be bent by holding with pliers and coaxing round with the fingers. Make up your mind how a bend is to go—then force it there. This wire will not stand bending one way and back again, for then it would break. Bend the undercarriage to shape, keeping the two sides as evenly balanced as possible. Slip it into the slots on the fuselage and fix it there by tying the two sides together under the fuselage with thread, which is finally coated with cement (Fig. 2).

The end of the propeller axle is bent into a loop to take the rubber motor. This is most easily made, using flat pliers, by keeping the sides of the square the same as the width of the plier nose, and working back from the end of the wire. Pass the axle through the fuselage nose block, thread on three cup washers and then the propeller. Cut off the end of the wire and turn it back into the propeller, fixing it there with a spot of cement.

Making a Propeller.

If you decide to make the propeller, select a piece of wood without flaws and as evenly grained as possible. Red deal, yellow pine and spruce are all suitable. Choose a piece in which there is no great difference in the colour of the grain. This indicates that the wood is "mild" and will work easily. Balsa wood can be used for propellers; but, although it is easy to work, it is not very strong and a balsa propeller will not survive many crashes.

Before carving, the block should measure 7½ inches long, 1 inch wide and ¾ inch thick (Fig. 6). At exactly half the length mark a line with a pencil and try-square round all four faces of the wood (i). Mark the centre, back and front, and drill a hole for the wire shaft, working from each side so as to keep the hole true, and employing the same bradawl (Fig. 4) as you used for the nose block.

Mark out the wood as indicated (ii). To show the marking on all surfaces

the four sides and the two ends have been imagined to be unwrapped, as it were, and spread out flat. The wide face with the $\frac{1}{4}$ inch marks on the corners will be the front of the propeller. Draw the lines on the ends and join the dots on the front and back with free-hand lines, making the curves as smooth as possible (iii). Scribble on the waste wood. This completes the marking out and the block should appear as at (iv).

Fix the block edgeways in a vice and saw down the centre-line as far as the propeller line on each side. Carefully chisel away the waste down to the saw-cut following the outer curve of the propeller marked on one of the faces (v). Turn the wood over and repeat at the other side (vi). Now, with a wide chisel, cut away some of the waste on each side near the ends, working towards the ends and carefully down to the lines marked on them (vii).

The next step is the most important as on it depends the accuracy and efficiency, or otherwise, of your propeller. With the propeller held in a vice, and one end projecting, carefully work away the waste until at every point the surface is straight when checked with a rule. This can be done partly with a chisel, used bevel-undermost, and partly with a file. Do not try to curve the propeller but merely concentrate on getting each surface flat laterally (viii).

Shape both ends. Do not bevel too far back, otherwise you will take away some of the area which is most useful in providing "lift" (ix). At this point you can start testing balance, by supporting the propeller on a pin and seeing if either blade always swings to the bottom. If the unevenness is only slight, do not bother about it for a time; but, if it is much, try to even it up by taking a little more off the tip of the heavy blade, or by thinning its tip slightly.

Balancing the Blades.

Finally, with a file and glasspaper, round off all edges and, except at the centre, rub the remaining edges of the $\frac{1}{4}$-inch front and $\frac{1}{8}$-inch back down into smooth shapes. Aim at getting an aerofoil section with a flat under-surface (x). Balance the blades by carefully working down the tip of the heavier one.

Cement the fin to the centre of the tail plane and fix the small incidence block (W) under the leading edge of the centre section. Attach the wing and tail unit to the fuselage with rubber bands (Fig. 5). The approximate position of the wing is shown in Fig. 1, but its exact location must be fixed later during the flying trials.

For power you need a strip of rubber of $\frac{1}{8} \times \frac{1}{20}$ inch section 90 inches long. This should be passed round the hook on the propeller axle and tail skid, the ends being joined with a reef knot, so as to form a 6-strand motor. If the rubber is coated with rubber lubricant (from the model shop) it will stand more winding and consequently give a longer duration of flight.

For the first flying test do not wind the rubber, but use the model as a glider. Hold the fuselage just behind the undercarriage and throw the plane gently forward. If it dives steeply, advance the wing. If it drops its tail as it leaves the hand and then spirals, move the wing back. Next give the

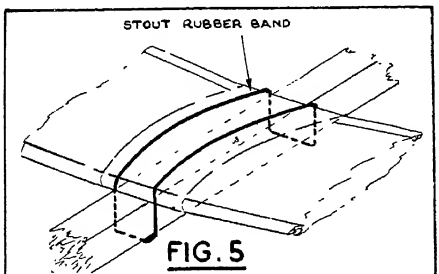


FIG. 5

FIXING MAIN AND TAIL PLANES

It should be noted that the exact location of the wing is found during trial flights.

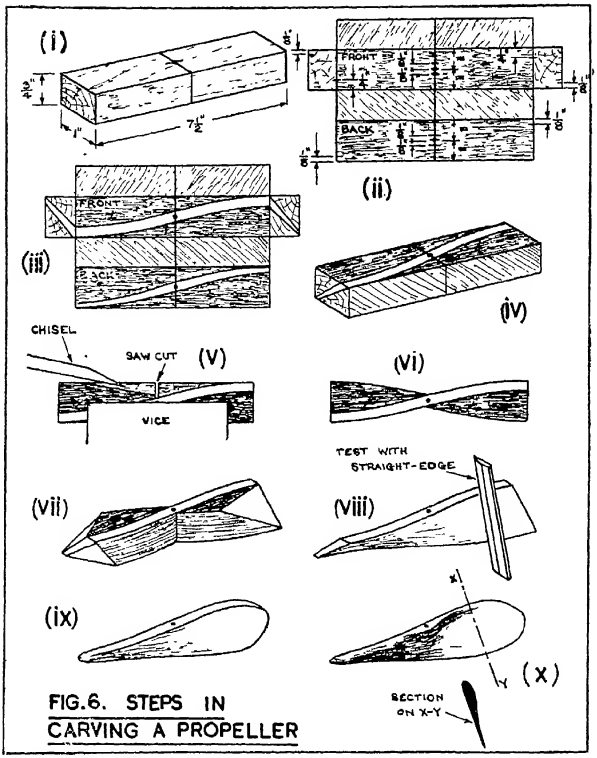


FIG.6. STEPS IN CARVING A PROPELLER

You may wish to make propellers for any of your model aeroplanes and this series of working diagrams shows you how the work can best be carried out.

propeller about 50 turns and hand-launch the model in the following way: Hold it as before with one hand and steady the propeller with the other. Release the propeller just a moment before throwing the model forward. Watch its behaviour and trim the wing forward or back a little until the model flies level. These tests can be made in a large room, but when you have completed trimming, take the model out of doors, give its motor the maximum number of turns (about 700, depending on the rubber) and launch it into the blue. It should then climb steadily until the motor runs down and complete its flight with a long shallow glide back to earth.

LIST OF MATERIALS

Part.	*Name.*	*Material.*	*Sizes.*
A	Fuselage	Deal, pine or spruce.	$\frac{3}{8}$″ square
B	Nose block	,, ,, ,,	$\frac{1}{2}$″ × $\frac{3}{8}$″
C	Tail skid	,, ,, ,,	$\frac{1}{2}$″ × $\frac{3}{8}$″
D	Undercarriage	Piano wire	20 gauge
	Tail plane—		
E	Leading edge	Balsa	$\frac{1}{8}$″ square
F	Spar	,,	$\frac{1}{8}$″ square
G	Trailing edge	,,	$\frac{3}{16}$″ × $\frac{1}{16}$″
H	Tip	,,	$\frac{1}{16}$″ sheet
J	Centre section	,,	$\frac{1}{32}$″ sheet
	Fin—		
K	Leading edge	,,	$\frac{3}{16}$″ square
L	Rib	,,	$\frac{3}{32}$″ square
M	Tip	,,	$\frac{1}{16}$″ sheet
N	Base	,,	$\frac{1}{16}$″ sheet

Part.	*Name.*	*Material.*	*Sizes.*
O	Trailing edge	Balsa	$\frac{3}{16}$″ square
P	Tail plane rib	,,	$\frac{1}{16}$″ sheet
	Main plane—		
Q	Rib	,,	$\frac{1}{16}$″ sheet
R	Leading edge	,,	$\frac{1}{8}$″ square
S	Spar	,,	$\frac{1}{8}$″ square
T	Trailing edge	,,	$\frac{3}{16}$″ × $\frac{1}{16}$″
U	Tip	,,	$\frac{1}{16}$″ sheet
V	Centre section	,,	$\frac{1}{32}$″ sheet
W	Incidence block	,,	$\frac{1}{8}$″ square
X	Propeller axle	Piano wire	20 gauge
	Washers	Cup washers (3) to fit axle.	
	Propeller		7½″ diameter, medium pitch.
	Motor		$\frac{1}{8}$″ × $\frac{1}{20}$″ rubber, 90″ long.

A 36-INCH SPAN TOW-LAUNCHED GLIDER

THIS glider may be hand-launched in the same way as the simpler 14-inch span glider, but it is really designed for tow-launching, *i.e.*, launching from the end of a tow-line which assists it to soar to a considerable height before releasing itself from the line. In this way the glider starts its flight from a more favourable position and will glide further and for a longer period than if hand-launched.

The construction is very similar to that of the 21-inch span aeroplane, except that a built-up fuselage is used instead of the plain stick, this fuselage being of the diamond type. It is square in cross-section, but the square is turned up on edge. The whole of the model, except for the fuselage, formers and tow-hook, is made of balsa, covered with tissue. The list of materials at the end of this article shows what is required whilst Fig. 1 gives the sizes of the parts.

Start by making a full-size drawing of the fuselage, tail plane, fin, centre section and outer plane. When drawing the fuselage, put in the centre-line first and draw lines across it to show the positions of the struts. Mark off the lengths of those dimensioned in Fig. 1. Notice that at the tail the longerons meet at a point. Bend a rule through the points so far marked and get someone to run a pencil along the rule while you hold it in position. Make sure that the lines of the longerons are equally arranged above and below the centre-line.

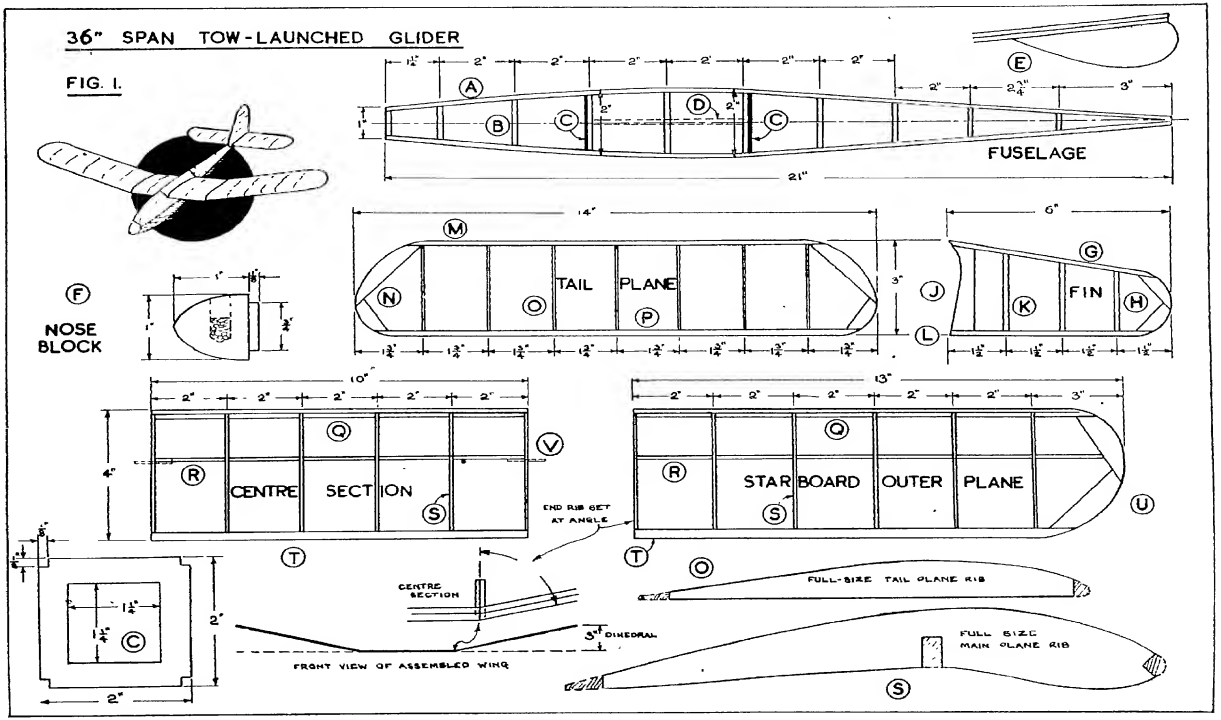
The fin and tail plane are constructed as in the last model. Cut one rib to the full-size pattern (O) and use it to mark out the other six. Cut them all exactly alike, and hold them side by side while you glasspaper their tops to the same curve. The tips (N and H) are cut in two pieces so that the grain roughly follows the curve, giving strength with lightness. Cut the underside of the fin (J) to fit over the centre rib of the tail plane. Assemble and cement the parts on the drawing, holding them with pins as before.

The wing has a wide centre-section to which the outer planes are attached. The ribs have curved undersides (S). This shape is a little more difficult to cut than a flat-bottomed rib, but a wing with this section has better lifting qualities, when used in a comparatively slow-flying model, than one with a flat undersurface. Make up the centre-section on the drawing, fixing all the ribs upright on the spar (R) before cementing on the leading and trailing edges. The leading edge strip is fixed edgeways in the slots in the noses of the ribs.

Making the Outer Planes.

Make up a pair of outer planes in the same way, but set the inner ribs at the angle shown in Fig. 1. This is done so that the outer planes will have the correct dihedral when the whole wing is assembled. Round off the front of the leading edge and cut the ends of the strips flush with the outsides of the joining ribs on all three parts. There is no need to make a jig for fixing the dihedral of the wing. All you need are two blocks or boxes 3 inches high. Use plenty of cement on the joining ribs and put the three parts of the wing together, supporting the wing tips on the 3-inch blocks. Cramp the joints with wire paper clips. Strengthen the job, after the cement has set, by cutting a groove through the joined ribs alongside the spars and cementing in a slip of $\frac{1}{32}$-inch plywood, 1 inch long (V).

The fuselage, when first built, has all four sides exactly alike. The longerons have only a slight curve and there should be no difficulty in bending them. Make up two sides exactly as in the drawing, ignoring parts C and D for the moment. A side should be built up in steps, starting either from the nose or from the longest struts, cramping the joints with pins at each step.



A SERIES OF WORKING DIAGRAMS WHEN MODELLING THE LARGE GLIDER

This is a much more ambitious glider than the one first described. It may be hand-launched, though really designed for tow-launching. All the necessary measurements are given above. In the top left-hand corner is a sketch of the finished model.

Cut two fuselage formers (C) from $\frac{1}{32}$-inch plywood. These are used to keep the fuselage shape true, as well as to strengthen it. When you have made up two fuselage sides, cut two more sets of struts, *i.e.*, for each strut in one side cut two more the same length.

Stand the two fuselage sides on edge and cement the two fuselage formers (C) between them in the positions shown. Fix the other struts opposite the existing struts. You cannot cramp the joints with pins as the fuselage is curved both ways ; but you may secure them by slipping rubber bands round the fuselage, being careful not to let the fuselage twist. The formers will keep the cross-section accurate, but the parts may slip out of shape lengthways or all the squares may not line up with each other when viewed end-on. Any fault like this should be corrected before the cement sets.

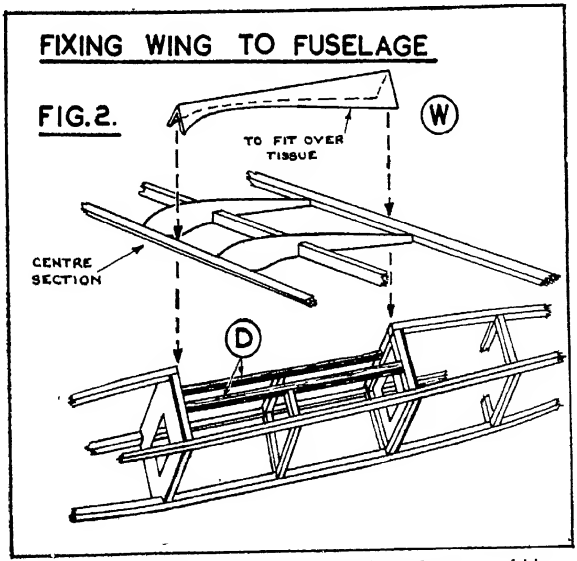
Select one longeron to form the top of the fuselage, and cut it away between the struts cemented to the formers. Also cut away half of the two struts on each side of the cut longeron, and fix two centre section bearers (D). These two bearers should be parallel and level (Fig. 2), as the centre section has to fit snugly down on them. At the tail, cut away the top longeron as far as the first struts so that the two side longerons form the tail plane bearers (Fig. 3). Cut a piece of $\frac{1}{16}$-inch balsa to form the tail skid (E) and cement it to the bottom longeron.

Before covering the parts, the combined front skid and towing hook should be bent up with pliers and fixed to the bottom longeron by a thread binding covered with cement (Fig. 4).

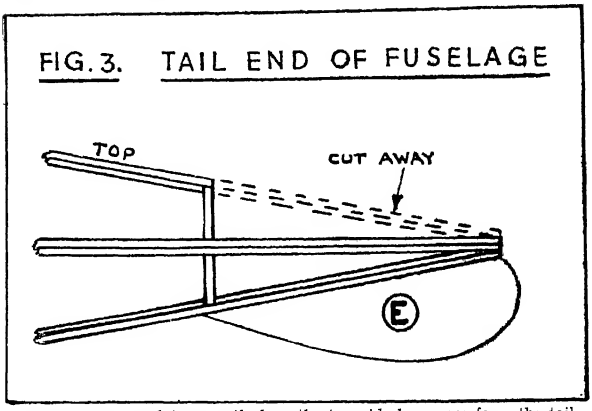
The Dope to Use.

Cover all the parts with tissue, tensioning it by steaming and doping as described for the last model. Use clear tightening dope. Coloured dope is too heavy to be applied all over the model, but if you like to use a bright colour on the part of the fuselage forward of the wing you can do so without spoiling the model's flying qualities.

Put the wing in position in the slot and make a fairing (W, Fig. 2) to fit above it and carry on the line of the fuselage. The best way to do this is to make one in paper first, trimming it accurately to fill the space, and then using it as a template to mark out two



The piece which carries on the line of the fuselage is known as a fairing. A template should first be made in paper.



This diagram explains exactly how the two side longerons form the tail plane bearers.

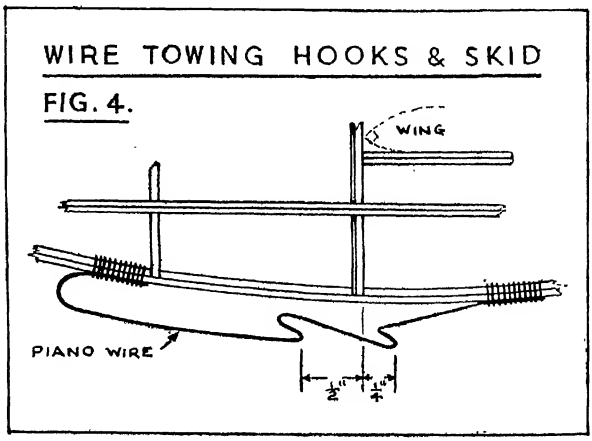
pieces of $\frac{1}{32}$-inch balsa which are cemented to each other and to the wing.

Cement the fin to the tail plane, and either cement the tail plane to the fuselage or fix it with a rubber band. Fix the wing with a rubber band passed over the top surface on each side of the fairing and under the fuselage.

Make the nose block (F) from a 1-inch square piece of wood. Before shaping it, drill a $\frac{3}{8}$-inch hole about $\frac{3}{4}$-inch deep. This should be drilled cornerways, if you can manage it, but it is easier to drill it at right angles to a surface, and it does not make any difference that way, except in appearance. Cut back one end to $\frac{3}{4}$-inch square, or cement on a $\frac{3}{4}$-inch square piece of $\frac{1}{8}$-inch wood. This square should fit closely into the nose of the fuselage. Mark the centre of the other end of the block and file it into shape. Glue the block in the fuselage nose with the hole upwards (Fig. 5).

To balance the model, support it lightly at the wing tips, with the fingers opposite the ends of the spar, and add lead weights or pellets to the hole until a balance is secured. Plug the hole with a bit of round rod, but do not fix it permanently as you will probably have to alter the weight slightly when you flight-test the model. Make your first tests by hand-launching the glider towards some soft grass or a carpet. If it dives steeply, remove some of the weight. If it stalls, *i.e.*, drops its tail as it leaves your hand, increase the weights.

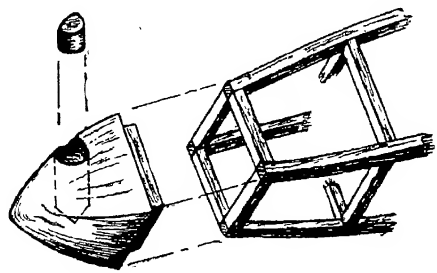
For your first tow-line, use a piece of



Make your towing-hook very carefully with the aid of pliers, noting that it also forms the front skid.

stout thread about 50 feet long. You can experiment with longer lines later. At one end tie a small metal or bone curtain ring, of a size that will loosely fit over the towing hook. Use the forward hook for your practice flights. The other hook will give you greater height, when you have gained some experience with the tow-line, but even then it is more difficult to manage. However, one of the great attractions of model flying is the amount of experimenting which you can carry out yourself; and as you try various weights or lengths and positions of the tow-line you will find conditions which suit your particular model and so obtain improved flights.

FIG. 5. FIXING NOSE BLOCK



Observe that the square formed at the back of the nose should fit snugly into the end of the fuselage.

To launch the glider from the tow-line, lay out the line on the ground with the ring down-wind. Hook the glider to the ring and get an assistant to hold it just below the wing. Hold the other end of the line and run into the wind. The assistant releases the glider as soon as the line begins to pull. There is no need to race, but you should run fairly quickly at first and then slow down after a few steps. The model will soar upwards, like a kite; and, as it gets to a good height, the tow-line will drop off, leaving the model to commence its glide. With practice you will be able to "play" the glider up to the maximum height that the line will reach, and so get the longest possible glide.

LIST OF MATERIALS

Part.	*Name.*	*Material.*	*Sizes.*
	Fuselage.		
A	Longeron	Balsa	$\frac{1}{8}$″ square
B	Struts	,,	$\frac{1}{8}$″ square
C	Fuselage former.	Plywood	$\frac{1}{16}$″ thick
D	Centre section bearer.	Balsa	$\frac{1}{8}$″ square
E	Tail skid	,,	$\frac{1}{16}$″ sheet
F	Nose block	,,	1″ square
	Fin.		
G	Leading edge	,,	$\frac{1}{8}$″ square
H	Tip	,,	$\frac{1}{16}$″ sheet
J	Base	,,	$\frac{1}{16}$″ sheet
K	Rib	,,	$\frac{1}{8}$″ square
L	Trailing edge		$\frac{1}{16}$″ × $\frac{1}{16}$″
	Tail plane.		
M	Leading edge	Balsa	$\frac{1}{8}$″ square
N	Tip	,,	$\frac{1}{16}$″ sheet
O	Rib	,,	$\frac{1}{16}$″ sheet
P	Trailing edge	,,	$\frac{3}{16}$″ × $\frac{1}{16}$″
	Centre section and outer planes.		
Q	Leading edge	,,	$\frac{1}{8}$″ square
R	Spar	,,	$\frac{1}{8}$″ square
S	Rib	,,	$\frac{1}{16}$″ sheet
T	Trailing edge	,,	$\frac{1}{4}$″ × $\frac{1}{16}$″
U	Tip	,,	$\frac{1}{16}$″ sheet
V	Dihedral brace	Plywood	$\frac{1}{16}$″ thick
W	Fairing	,,	$\frac{1}{16}$″ sheet

A HIGH-WING CABIN MONOPLANE

THIS model has a most realistic appearance, being very similar to many popular types of full-size light aircraft. Its construction is straightforward, and anyone who has made one of the models described in earlier pages should find it easy to build. It ought not, however, to be attempted as a first model.

The wings and tail unit follow closely along the lines of the previous designs. The fuselage has a box section, which encloses the rubber motor. The undercarriage wheels allow the plane to take off from a smooth floor. The propeller is fitted with a simple free-wheel device which permits it to spin freely after the motor has run down, thus lessening the resistance to the airflow and increasing the length of the final glide.

Commence by making a full-size drawing of the principal parts. Fig. 1, except where marked otherwise, is drawn to a scale of $\frac{1}{4}$ full-size, so to obtain any length which is not marked you should measure its length on the drawing and multiply it by four to arrive at the actual model size. Be careful when drawing the top view of the fuselage to get the two curves equal on each side of the centre-line.

The construction of fin and tailplane is almost the same as with the earlier models. The tail plane ribs are not shaped before assembly, but the top surfaces are rubbed down to a slight curve with glasspaper after they have been cemented in position. Round off the leading edges, but do not cement the fin in place until after the surfaces have been covered.

The main plane has double spars (Y), which are a little complicated to fit, but make a very stiff wing. It is sometimes difficult to prevent a lightly braced wing from warping, and the second spar helps in keeping the outer plane true. Make up each outer plane in the usual way, fixing the ribs (V) to the bottom spar and then adding the top spar and the leading and trailing edges (X and Z). At the outer rib, notch the top spar underneath and bevel its end so that it can be bent down to the wing tip. Cut the inner ends of the leading and trailing edges and the bottom spar flush with the inner ribs, but let the upper spar project $\frac{3}{4}$ inch.

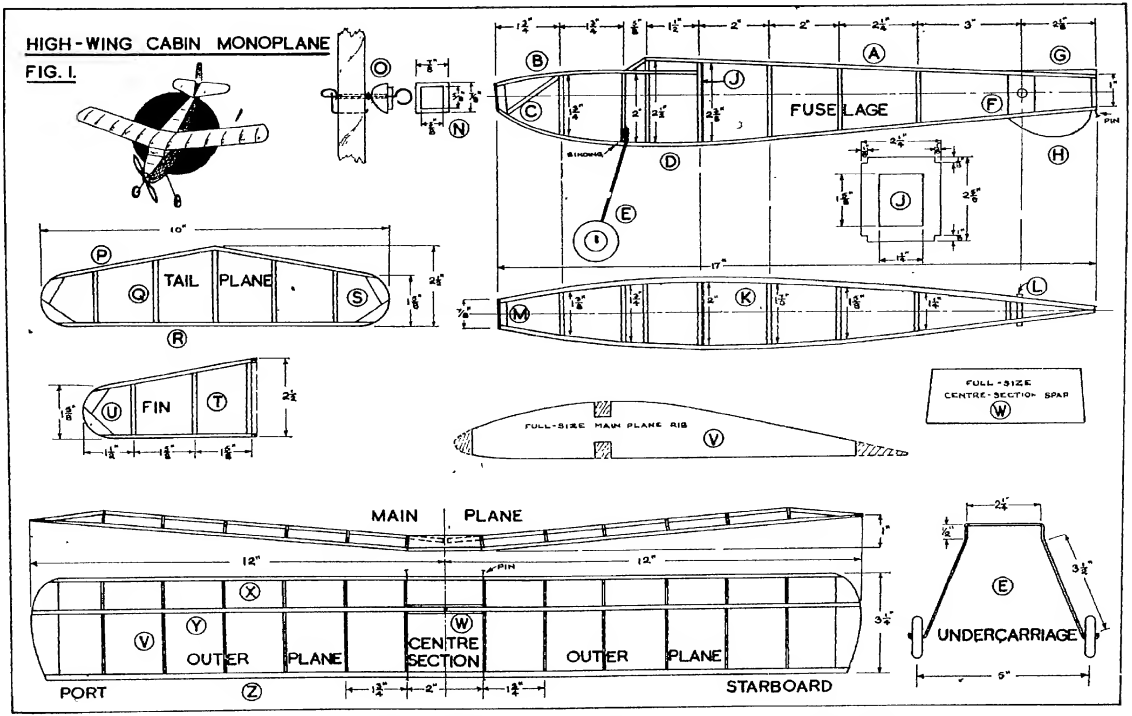
Cut the two centre-section spar sides (W) from $\frac{1}{32}$-inch plywood and cement them each side of the projecting upper spar ends while the wing tips are supported on 1-inch blocks. Fix short lengths of leading and trailing edge in position and cramp the whole framework with pins (Fig. 2)

Making the Fuselage.

Select good pieces of fairly hard balsa for the fuselage longerons (A), building two sides exactly alike over the drawing. Notice that the nose end of the fuselage is not exactly upright, but has a slight downward tilt. The curve of the bottom longeron is fairly sharp under the nose, but the strip may be bent to shape in the following manner: Fix all the other parts in position on the drawing, and cement the lower longeron to the bottom of the nose strut first, cramping it with a pin. Work back towards the tail, cementing and pinning at each strut in turn.

When both sides have been completed, join them with the cross-struts, starting at the thickest part, just aft of the cabin. Fix the $\frac{1}{32}$-inch plywood former (J) and cramp the whole assembly with rubber bands until the cement dries. At the tail, fit the two tapered tail plane bearers (G) to the top longeron, and the tail skid (H) midway between the bottom longerons. Push a small pin into the tail aft of the tail skid, to hold the tail-fixing rubber band.

The undercarriage is made of a single piece of 20 gauge piano wire 12 inches long (E). Bend it to shape with pliers, making the width across the top the same as the fuselage width at



THESE DIAGRAMS REFER TO OUR ATTRACTIVE MODEL MONOPLANE

The small sketch in the top left-hand corner gives an excellent idea of the finished model, which has a most realistic appearance. It ought not to be attempted as a first model.

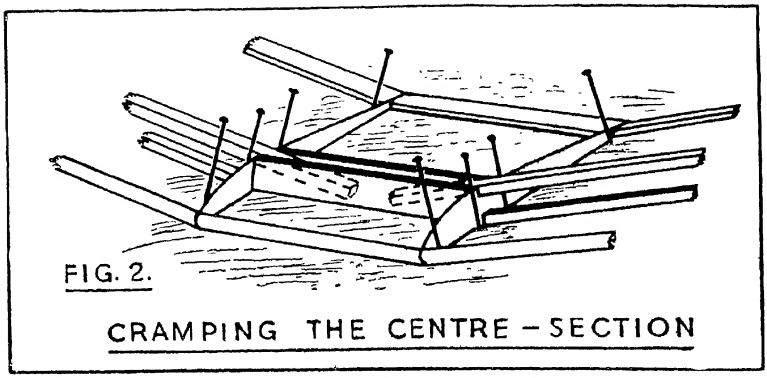


FIG. 2.

CRAMPING THE CENTRE-SECTION

When the short lengths of leading and trailing edge are in position they should be cramped with pins.

the point where it is to be fitted (2¼ inches). The wheels should be purchased ready-made, unless you have a lathe, in which case you could turn them—1¼ inch diameter.

The nose block (O) may be filed and glasspapered to shape from a solid block of balsa or from one built up from several sheets. If you build up the block, which is then called a laminated block, cement the sheets with their grain at right-angles to each other. Drill the block to take a piece of brass tubing which forms the bearing for the propeller axle (Fig. 3). The back of the block should fit in the fuselage nose. To strengthen this part, cut a piece of $\frac{1}{32}$-inch plywood (N) to fit the block, and cement it to the front of the fuselage. Do not cement the nose block to the fuselage.

The propeller may be bought ready-made or you can carve it yourself in the same way as the propeller for the simpler model. (See p. 299.) Instead of the block as described in that article, use one 8½ × 1⅛ × ¾ inches. Except for these differences in over-all sizes, the other dimensions and the method of carving are exactly the same. The hole through the centre of the propeller should be an easy fit on the wire used for the axle, but it ought not to be so loose that the propeller wobbles.

A Free-Wheel Clutch.

To make the axle, bend up the motor loop with pliers, then slip the wire through the nose block bearing, fit three cup washers, and slide on the propeller. Bend the end of the wire into a long loop as shown (Fig. 3). Fix another short wire through an easy-fitting hole in the propeller about ⅜ inch away from the centre. Bend over the back of this wire to prevent it slipping out, and turn down the front so that it lies across the axle loop. Cut it off so that when the loop is turned away from it, its end lies midway between the two sides of the loop. This wire forms the free-wheel clutch.

Cover the parts with jap tissue, tensioning it with steam and clear dope in the same way as with the previous models. Leave the space between the tail plane bearers uncovered, so that you can reach and fix the rear end of the rubber motor to the motor peg (L). To give a more realistic appearance, cover the part round the front and sides of the cockpit with clear cellophane or thin celluloid.

The main plane should be fixed to the fuselage with two rubber bands and four pins. Push the pins into the four corners of the centre-section and pass the two bands round the fuselage. Fasten the wing by slipping the pin

heads under the rubber bands. The correct position of the wing is with its leading edge a little way aft of the front of the cockpit roof. Fix the tail plane with a single rubber band passed under the fuselage forward of the tail plane, over its upper surface each side of the fin and down to the pin behind the tail skid.

For the motor you need 5 feet of $\frac{1}{8} \times \frac{1}{16}$ inch rubber. Bend this up to form three loops, and tie the ends with a reef knot. The motor is longer than the distance between the two points of attachment, but this is intentional as it enables the rubber to be given a greater number of turns. It is a good plan to put a piece of cycle valve rubber over the loop on the propeller axle to minimise wear on the motor. Treating the rubber with special lubricant is an advantage, but you must obtain the correct lubricant from a model shop. Do not use ordinary machine oil as this is injurious to the rubber.

The easiest way in which to fit the rubber is to attach it to the hook on the propeller axle and tie a piece of string to the other end. Weight the string by tying a knot in it, then hold the fuselage, without the tail plane, vertically; and lower the string through it until you can grasp its end between the tail plane bearers. Pull the rubber through, push the peg (L) between the strands, and remove the string.

Testing the Model.

Try the model first as a glider, and adjust the position of the wings until the correct trim is found. For an initial power test, engage the free-wheel, give the motor about 100 turns, and hand-launch it. If this is satisfactory try a greater number of turns and allow the model to take off under its own power from the ground. It will only do so from a smooth hard surface and it is no use trying to bring about the movement on grass or earth. A runway of boards is most convenient.

It is very tedious putting on a large number of turns directly by hand, and some sort of gearing is desirable. A common device used for this purpose is an engineer's hand drill carrying a wire hook which is engaged with the loop on the front of the propeller axle (Fig. 4A). This has a gear ratio of about six to one, so for each turn of its handle the rubber motor is given some six turns (you can find the exact number for a particular drill by counting the number of times the propeller axle turns for one turn of the drill handle).

Another type of winder is shown in

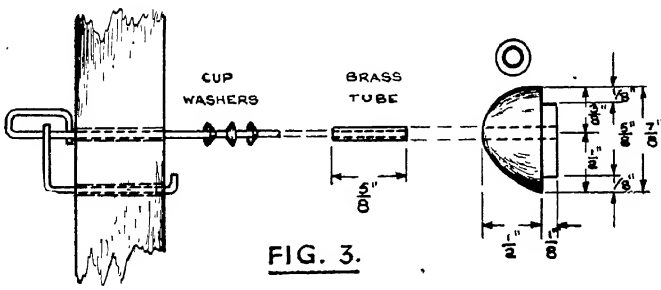
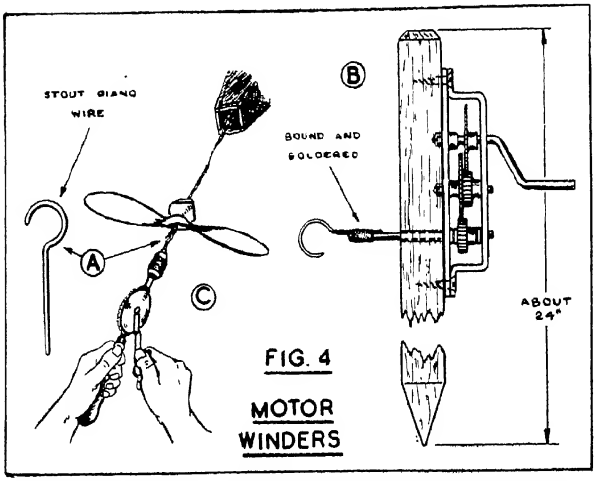


FIG. 3.

THE PARTS OF THE PROPELLER ASSEMBLY

It will be noted that the block has a piece of brass tubing to form the bearing for the propeller axle.



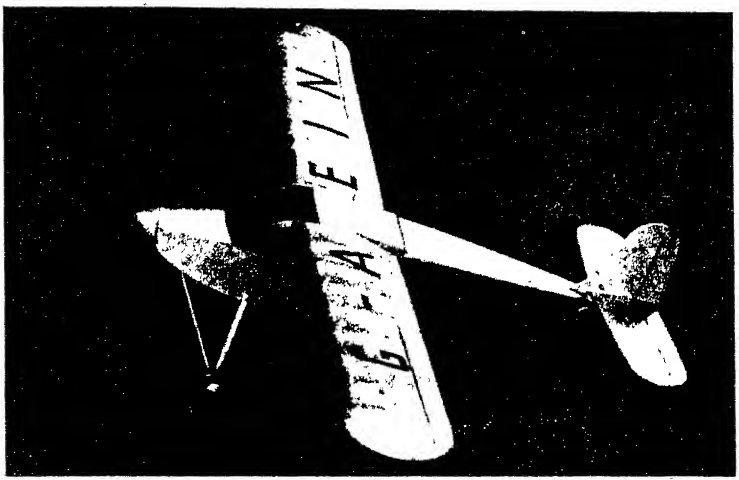
Model aeroplane winders may be made from cogs taken from an old clock. Make the hook from piano wire.

Fig. 4. This can be built up from cogs taken from an old clock, or suitable parts may be bought from a model shop. The gearing is mounted on axles supported in a frame made from two pieces of $\frac{1}{2} \times \frac{1}{8}$ inch strip iron. The whole apparatus is screwed to a post which can be pushed into the ground. The sizes of your winder, and its gear ratio, depend on what cogs you obtain. That shown in the sketch has a gear ratio of nine to one; the propeller being turned nine times for every turn of the handle. This is brought about by having the cog on the handle axle three times the size of the one it drives, and the other cog on the centre axle three times the size of the one on the hook axle. The hook is made from piano wire and is bound with thin wire to the axle, then soldered.

You can obtain a greater number of turns on this, or any other rubber-driven model, if the motor is stretch-wound. To do this, get an assistant to hold the model while you pull the propeller and nose block forward, and commence twisting the rubber with a winder (Fig. 4C). As the number of turns increases, allow the rubber to shorten until the nose block is back in position in the fuselage.

LIST OF MATERIALS

Part.	*Name.*	*Material.*	*Sizes.*
	Fuselage.		
A	Top longeron	Balsa	$\frac{1}{8}$" square
B	Front longeron	,,	$\frac{1}{8}$" square
C	Brace	,,	$\frac{1}{8}$" square
D	Bottom longeron	,,	$\frac{1}{8}$" square
E	Undercarriage	Piano wire	20 gauge
F	Peg support	Balsa	$\frac{3}{4}$" × $\frac{1}{8}$"
G	Tail plane bearer	,,	From $\frac{1}{8}$" square
H	Tail skid	,,	$\frac{1}{16}$" sheet
J	Fuselage former	Plywood	$\frac{1}{32}$" thick
K	Strut	,,	$\frac{1}{8}$" square
L	Motor peg	Birch	$\frac{3}{16}$" diam.
M	Nose strut	Balsa	$\frac{1}{4}$" × $\frac{1}{8}$"
N	Thrust pad	Plywood	$\frac{1}{32}$" thick
O	Nose block	Balsa	$\frac{1}{8}$" square
	Tail Plane and Fin.		
P	Leading and trailing edges.	Balsa	$\frac{1}{8}$" square
Q	Rib	,,	$\frac{1}{8}$" square
S	Tip	,,	$\frac{1}{16}$" sheet
T	Rib	,,	$\frac{1}{8}$" square
	Main Plane.		
U	Tip	,,	$\frac{1}{16}$" sheet
V	Rib	,,	$\frac{1}{16}$" sheet
W	Centre-section spar.	,,	$\frac{1}{16}$" sheet
X	Leading edge	,,	$\frac{1}{8}$" square
Y	Spars	,,	$\frac{1}{8}$" square
Z	Trailing edge	,,	$\frac{1}{2}$" × $\frac{1}{16}$"



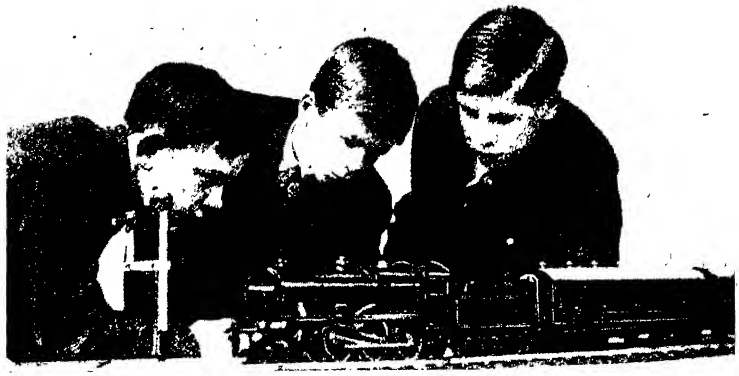
Model aeroplane construction and flying form one of the latest hobbies, a pastime constantly growing in popularity. Above is shown a well-made plane in miniature, and there appear in this section articles dealing with the building of both gliders and aeroplanes in a simple and more advanced form.



Photos: Model Aeronautical Press Ltd.

The youthful fans seen above, girls as well as boys, are obviously all air-minded, and the models they have brought to a meeting of their club tell of the patience and ingenuity as well as sound technical knowledge of aircraft. Modelling is an intensely interesting hobby, made more so when the miniature machines fly fast and far with complete air-worthiness.

MODEL RAILWAYS AND SHIPS



Photographs by courtesy of Messrs Bassett-Lowke Ltd., Northampton

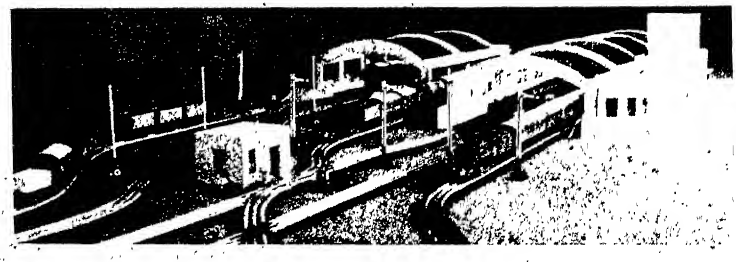
THE THRILL OF OWNING A RAILWAY

This gauge "o" model express is none other than the famous L.M.S. "Royal Scot." On a lay-out fed by direct current absolute control of the locomotive is possible from any point on the track, both in speed and direction. With automatic couplings shunting and marshalling can be carried out with realistic effect.

MODELS have always held a fascination for boys and the variety in existence gives us an enormous choice and field. There are those to be seen at great exhibitions and in museums or shop-windows before which thousands linger, and there are the practical hobbies for enthusiasts, running one's own railway, constructing a model 'plane or sailing a model ship.

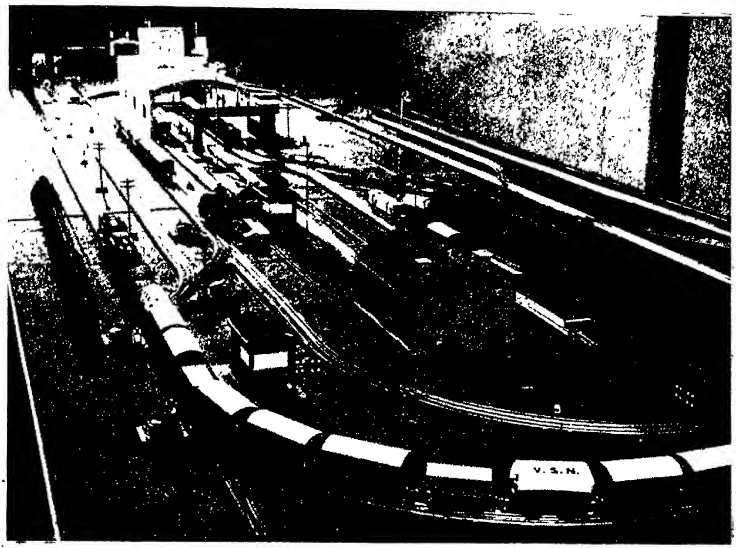
About the Gauges.

For those of you who favour railways I cannot do better than give a brief review of the different model gauges in use in this country to-day and their special features.



THE TRIX TABLE RAILWAY

The "oo" gauge line seen above has the novelty of running two or more trains on the same track, each one being under separate control. The locomotives are fitted with an alternating current motor, operated from A C. mains through a transformer.



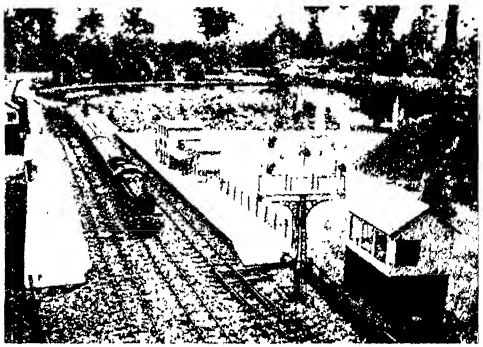
MAXIMUM SCOPE IN MINIMUM SPACE

This second picture of the Trix Twin railway shows the exciting possibilities of a small gauge. Here the method of conducting current is most ingenious. The track has three insulated rails and locomotive No. 1 is supplied by a centre rail and one outside running rail and locomotive No. 2 by centre rail and the other outside running rail. The track has a Bakelite base and snap fasteners so that it is easily assembled or detached.

When I first took an interest in model railways, wide gauges were in use, but as in those days model locomotive design bore little relation to the real thing, the size of gauge was not of vital importance. Lately a demand for more realism in models has grown up, which has resulted in the production of smaller gauges. You will see the necessity for this if you study the long type of express locomotive and realise the need for larger radius curves to run a model successfully.

For some years now, gauge "oo" (which is $\frac{7}{8}$ inch between the rails) has been making headway. The novelty of a comparatively inexpensive line, of a size which could accommodate a really comprehensive layout on a medium-sized table, meets with great enthusiasm. In the case of the Trix table railway, the locomotives are fitted with A.C. motors, either operated from A.C. mains through a transformer or worked from accumulators. In the Hornby "Dublo" system the engines are fitted with a permanent magnet motor working off direct current.

"oo" is the gauge for the man who prefers operation rather than construction. In the smallest gauges the building of locomotives and rolling stock is hardly a task for the amateur. He can get his fun from the running of his layout to a timetable schedule; and, if he has an artistic tendency, in preparing railside features and a scenic background for the railway. "oo" gauge is too small for a clockwork mechanism and hardly possible in steam, so electricity is the only prime mover left.



No. 1 GAUGE

Mr. Victor B. Harrison's 1¼-inch lay-out at Bishop's Stortford—one of the finest gauge 1 railways ever built. The steam loco "City of Truro" receives the all-clear as she passes through Lone Pine Station.

Choice of Motive Power.

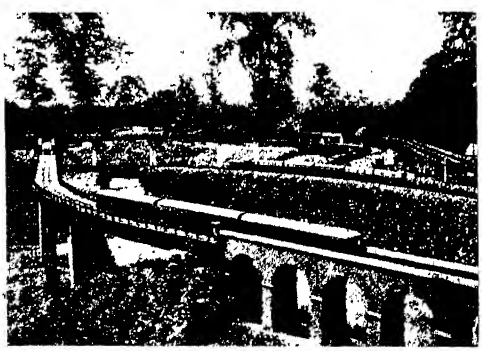
Next on our list is gauge "0" or 1¼ inches between the rails, probably the most popular gauge both in Europe and in America. It is a standard in all countries, and here I think we might discuss the prime movers available to the model railway hobbyist, clockwork, electricity and steam, for gauge "0" is one of the few gauges in which all three are possible and almost equally popular.

Clockwork, I should say, is the most suitable choice for youth. One simply winds up a spring and there is no mess or smell or risk to a small child. Also it can be used with equal success indoors or out-of-doors in a gale of wind. The cheapest models are obtainable in clockwork, although most elaborate models can be built with clockwork



A GAUGE "0" LINE

Mr. Cecil J. Allen sponsors an "0" gauge clockwork railway out of doors. In the garden for speed and healthy exercise or indoors for all-the-year-round working and super-detail production.



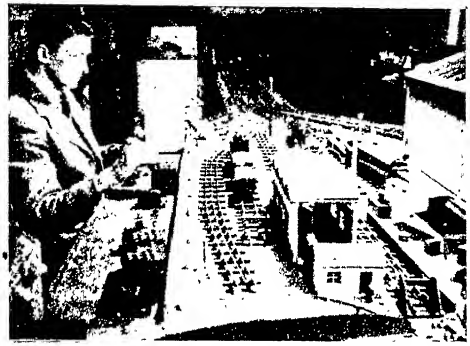
ELECTRICITY FOR GAUGE 1

Another view of Mr. Harrison's railway, showing the six-arch viaduct in the foreground. It is being crossed by a three-coach "Southern Electric" set.

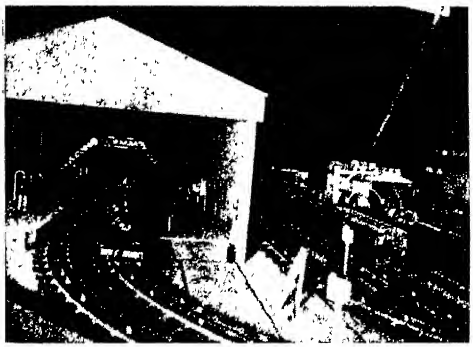
mechanisms as prime movers.

Steam always seems to make the greatest appeal and is the "senior" prime mover. There is with it the realism that corresponds to the work of the actual locomotive, and, given common sense, a model steam engine can be both clean and safe in its working.

The third power unit is electricity, the most popular prime mover of



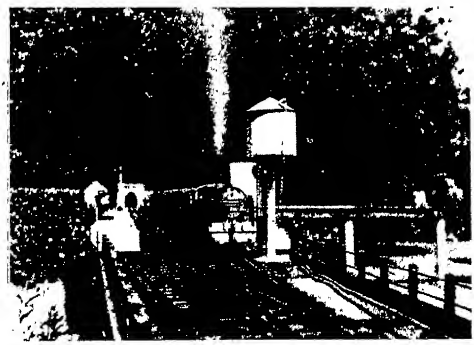
UNDER COVER
An enthusiast at the controls of his gauge "0" electric railway. The line has been built in a garage



ANOTHER VIEW
This is a different aspect of the model railway above. Garages, attics, basements, etc., all prove good spots in which to set up a system.

all. Electric trains take different forms—firstly models of existing electric trains and secondly replicas of steam locomotives with a specially designed motor concealed in the steam outline body. The most universal method is by means of track fitted with a conductor or third rail through which the motor picks up the current.

The permanent magnet motor is the type which most model railwaymen consider the best prime mover when it comes to refinement of control. These motors



AWAITING THE RIGHT-AWAY
Here the train on a model railway is waiting with steam up for the right-away. This line is gauge 1.



TEACHING THE YOUNG IDEA

A group of Sea Cadets is included among those watching this demonstration by the owner of his realistic model steam trawler.

have a current supply of about 8–10 volts D.C., supplied by storage batteries or from the A.C. house mains through a rectifier.

Electric locomotives are also fitted with alternating current motors working off 20 volts A.C. (but in general this is used on the less intricate kind of electric railway), operated from the house mains through a transformer.

Returning to gauge "0," the portable type of track is usually pressed tinned steel plate, but for more permanent structures scale model permanent way is used. To the average hobbyist gauge "0" presents perhaps the greatest scope. He can lay his own track, build his own wagons and coaches, and even construct his own locomotives. Signalling a line also presents another interesting phase of the hobby.

Gauge 1 (or 1¾ inches between the rails) is the next standard gauge, which is particularly popular with those who like an outdoor railway. As the scale grows, clockwork gradually becomes less suitable as a motive power and steam begins to come into its own. Gauge 1 is the commercial "limit" for clockwork traction, but electric power is also used quite frequently, and the size of the gauge 1 steam locomotive is big enough to house an efficient internally fired boiler. This gauge is a proposition for the serious amateur with both time and money to spend.

It is a big jump to the next gauge—2½ inches — which represents a scale of ½ inch to the foot. This is the size beloved of amateurs with engineering knowledge, who build their own working steam models, either fed by methylated spirit or with proper firebox using solid fuel.

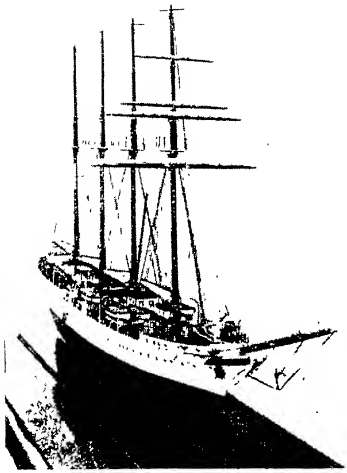
Ships of All Kinds.

Whether you own one, build one or make a study of shipping, this hobby makes a strong appeal, for being a seafaring nation, the ocean and the ships which sail the Seven Seas are uppermost in a British boy's mind.

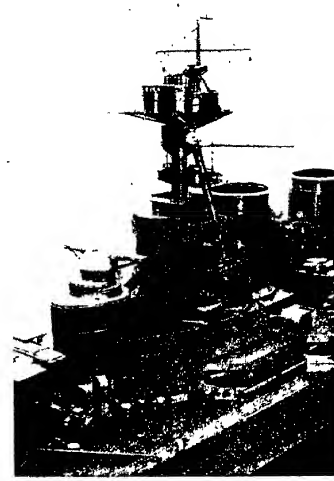
Model boats can be inexpensive ones made from pressed tinplate and driven by a clockwork motor, or with carved wooden hulls powered by either an electric motor or steam engine. This more elaborate type can be built in varied forms such as steam-yachts, tramp steamers, cargo boats, lifeboats—even modern liners or warships.

The most popular means of propulsion among amateurs is electricity, because there is less danger of the boat getting becalmed through the boiler running dry when it is in the middle of the lake. Where high speed is required, however, steam or petrol engine propulsion is far and away the most satisfactory.

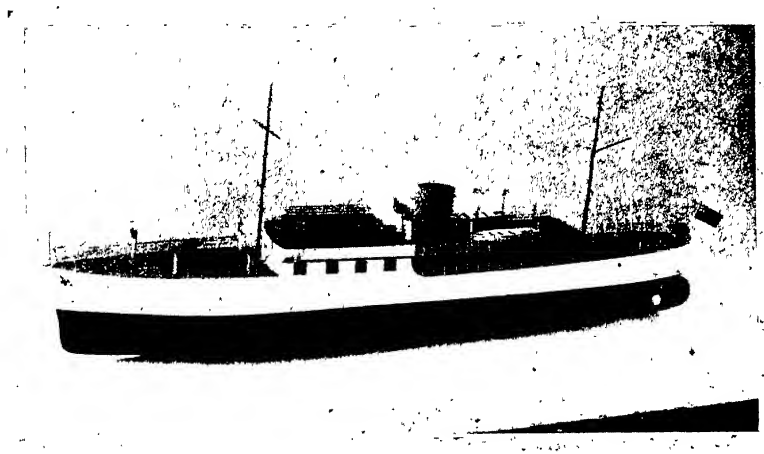
A PAGE OF MODEL SHIPS



This is a beautiful scale model of a Training Ship, the *Juan Sebastian de Eclano*. It is one-fiftieth actual size.



Here is a model of a famous British battleship, one-sixty-fourth actual size. Vessels of the Royal Navy make splendid models.



Here is a working model of a private steam yacht, and it can be seen how perfect the vessel is down to the smallest detail. The construction of ship models is a clever combination of science and art forming one of the most fascinating of pastimes.

KITES AND HOW TO MAKE THEM

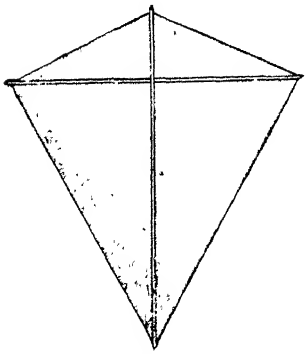


FIG. 1

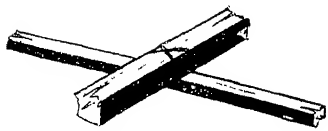


FIG. 2

These two illustrations show the first steps in making the kite described here. Fig 1 represents the frame of the kite, whilst in Fig. 2 you can see just how the bow is glued and lashed to the backbone.

HERE is a design for a kite that is very easy to fly, if carefully made and balanced. For the backbone cut a strip of straight-grained spruce, deal, or any light wood. This strip should be planed down to ¼ inch section, and cut 30 inches long. A strip of cane is needed for the bow; this should be slightly less in section.

The bow must be glued and lashed with strong thread to the backbone at a distance of 6 inches from the upper end; and, when the glue has set hard, cut to a length of 30 inches. To preserve the balance, measure 15 inches each way from the centre.

A length of strong thread, or fine twine, is tied at its centre to the tip of the backbone and tied right and left to the tips of the bow; see that both are the same length so as to keep the bow at right angles to the backbone.

The frame will now present the appearance shown at Fig. 1. For the covering use strong, brightly-coloured tissue paper, in one piece if possible. Lay the paper flat on the table, smear the face of backbone and bow with paste or liquid glue, press down on the paper, then turn the whole over and rub the paper well into contact. When set, trim the paper, with about ½ inch of margin, to the shape of the frame, paste the edges and turn over the thread, then press well down.

Strengthen the four corners by pasting over a small triangular piece of paper. For the bridle, cut a length of twine about 4 feet and attach it to the backbone about 4 inches from the top and 6 inches from the bottom.

Cut a tiny notch in each end of the bow about ¼ inch from the tips. Into the notch, at one end, tie a length of twine, then slip the twine round the other notch, and draw the ends of bow

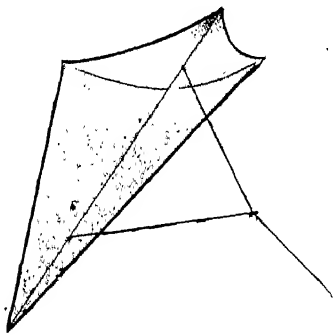


FIG. 3
The kite when completed.

together until the depth of curvature is a trifle over 3 inches.

The kite line is attached to the bridle, so that the upper portion of the bridle is shorter than the lower. When flying the kite, vary the position of the line to get the best results.

How to make a fine Box Kite.

To make a box kite you will require, first of all, four straight strips of light wood, each 2 feet 2 inches long and $\frac{1}{4}$ inch square, and two pieces of thin coloured paper measuring 4 feet 2 inches long and 10 inches wide. Take the strips of coloured paper, turn over the edges 1 inch and glue down the folds after inserting a length of fine, strong string in each fold. When completed, glue the ends of each paper strip with a 2-inch overlap so as to form continuous bands 8 inches wide. Now fold each band to divide it into four equal parts, and at each crease glue one of the long sticks. The outer edge of each band should be 1 inch from the ends of the sticks, and there should be a space of 10 inches between the bands, as indicated in the first diagram. Before gluing the sticks in place, slightly notch each one at a distance of 5 inches from each end to receive the notched ends of the cross-pieces A (Fig. 4).

For the cross-pieces, take two pieces of $\frac{3}{16}$-inch by $\frac{5}{16}$-inch stripwood, each $16\frac{1}{2}$ inches long, place them together and drive a fine wire nail through the centre, turning the end of the nail up underneath. Treat two more pieces of the same length in the same way. Notch the ends as at B, open out the cross-pieces, and fit them inside the kite. They must not fit too tightly, or they will split the paper. If they are too long, shorten them slightly and deepen the notches.

The flying line is tied on to one of the long strips in the position indicated at C. To fly the kite, let out about 20 yards of line, and get someone to throw up the kite a short distance in the usual fashion.

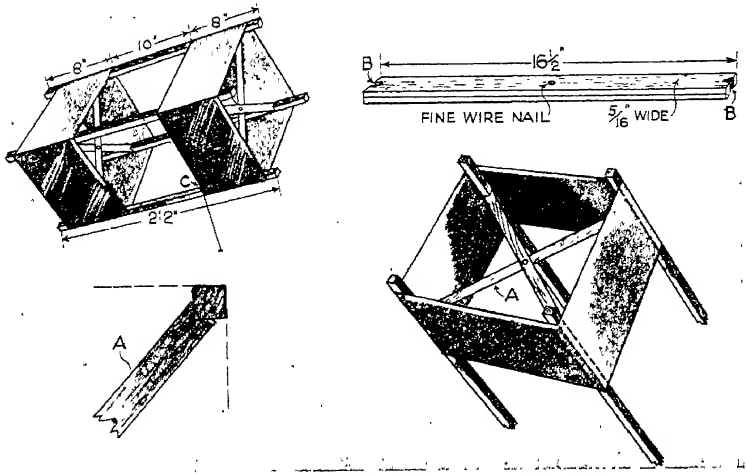
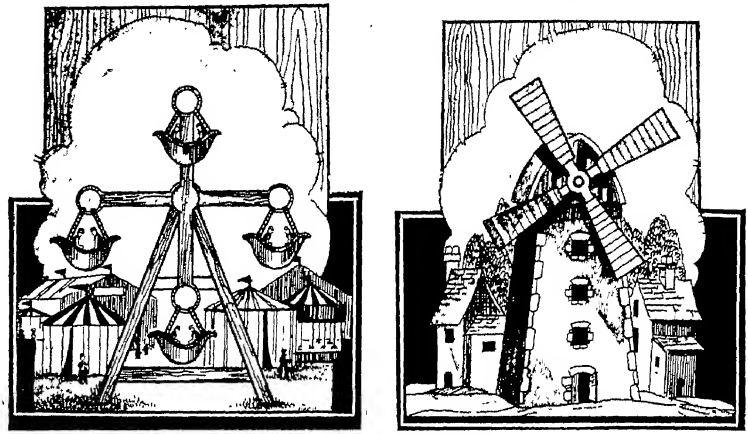


FIG. 4.—WORKING DRAWINGS FOR A BOX KITE

The top left-hand view shows the completed kite; the top right view one of the stretchers; the bottom left how the stretchers lock diagonally against the main members; and the bottom right one of the cellules with the stretchers A in position.

WORKING SAND MODELS



A DOUBLE-SIDED MODEL

Here is a fascinating sand model which on one side represents a windmill and on the other a set of big-wheel swing boats.

HAVE you ever tried making motive models, using sand as the working power? The steady trickle of the golden grains through a hopper on to a suitable mechanism can be turned into motive power in a similar way to the turning of a water wheel by a running stream. The above illustration shows the sort of thing which can be built, and it has been so planned that the sand works two different models from the same mechanism. The picture shown illustrates actually the back and front of the same article, and it can be seen there that on one side a model windmill with movable sails is incorporated, while on the other is one of those big-wheel swinging-boat arrangements seen at any fair.

How It Works.

The complete model shown is $7\frac{5}{8}$ inches high and $5\frac{9}{16}$ inches wide, with a box-pattern centre 2 inches deep. The mill sails of the model are turned by a rotating mechanism inside, and the illustration at Fig. 1 shows quite plainly how this is done. A box is made up, through the top of which sand is poured into a hopper which releases it in a steady stream on to a series of buckets. The weight of the sand turns these buckets on a central spindle, and the sand is emptied into a drawer container beneath. So long as the sand runs from the hopper at the top into the buckets to weigh them down, so the rotating spindle will turn the sails and the swinging-boat arms on the outside of the model.

Draw and Paint the Pictures on the Wood.

The various parts required are clearly shown in Figs. 3 and 4, and instructions on the manner of their cutting are also printed. In the top right-hand corner of Fig. 3 is an outline of one of the sides, and marked thereon are various dotted lines clearly indicating the position of the joining parts. The back and front are to be cut out of $\frac{3}{16}$-inch wood, and the positions of the parts are marked on it. For instance, the angle of the hopper made by the two parts A and B is obtained by marking the position on the inner surface of the sides, whilst a similar angle should be

marked off for the sand chute at the bottom. The pictures of the mill and swinging-boats should, of course, be drawn on these two parts, but the back and edges must be cleaned up in the ordinary way. Put the two parts together in boring the central hole to ensure that the spindle is horizontal.

The Box Container.

The container is made up of the back and front, two sides, and a top and bottom. The two sides go between the back and front. They are shorter than the length of the model itself, but are glued between the back and front flush with the top. This will provide a space of about $1\frac{5}{8}$ inches below, which is taken up later on by the drawer holding the sand. The top and bottom of the model are plain rectangles of wood glued above the sides and fronts. Although these parts have all been cut out and tested in place, only actually glue one front, the top and bottom and the two sides. This will leave the back of the model off, so that we can place in position the actual mechanism.

First get the pieces A and B, which form the sand hopper, and glue them at the angle indicated in the working drawing. One end of each has to be chamfered to the section shown to make it lie flat to the top. The piece A has a semicircular hole for the sand to trickle through, and in order to guide it up to this hole, little angle blocks cut from any odd piece of thick wood are glued into the corners, as shown by the detail at Fig. 2.

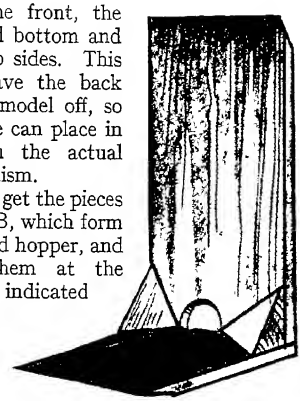


FIG. 2
Hole and wooden blocks to guide sand



FIG. 1
Mechanism showing how the sand wheel works.

Making up the Wheel.

Now make up the wheel itself, using $\frac{1}{16}$-inch pieces throughout. Two shaped sides are fitted over the pieces which form the scoops or buckets for the sand. The completed wheel is shown in Fig. 3, but one side has been purposely omitted to make the actual construction clearer. Be careful to see that the wheel blades A are glued at right angles to the sides, and to each other, so that a perfect square is formed round the central axle opening. To make a better scoop, the small pieces (B) which form the front of the box are glued to the blades themselves and on to the sides of the wheel. The axle which passes through the centre of the wheel should fit it quite tightly, and a liberal supply of glue added round the outside of it will give further strength.

Below this wheel are fitted the pieces

PATTERNS OF THE PARTS USED—

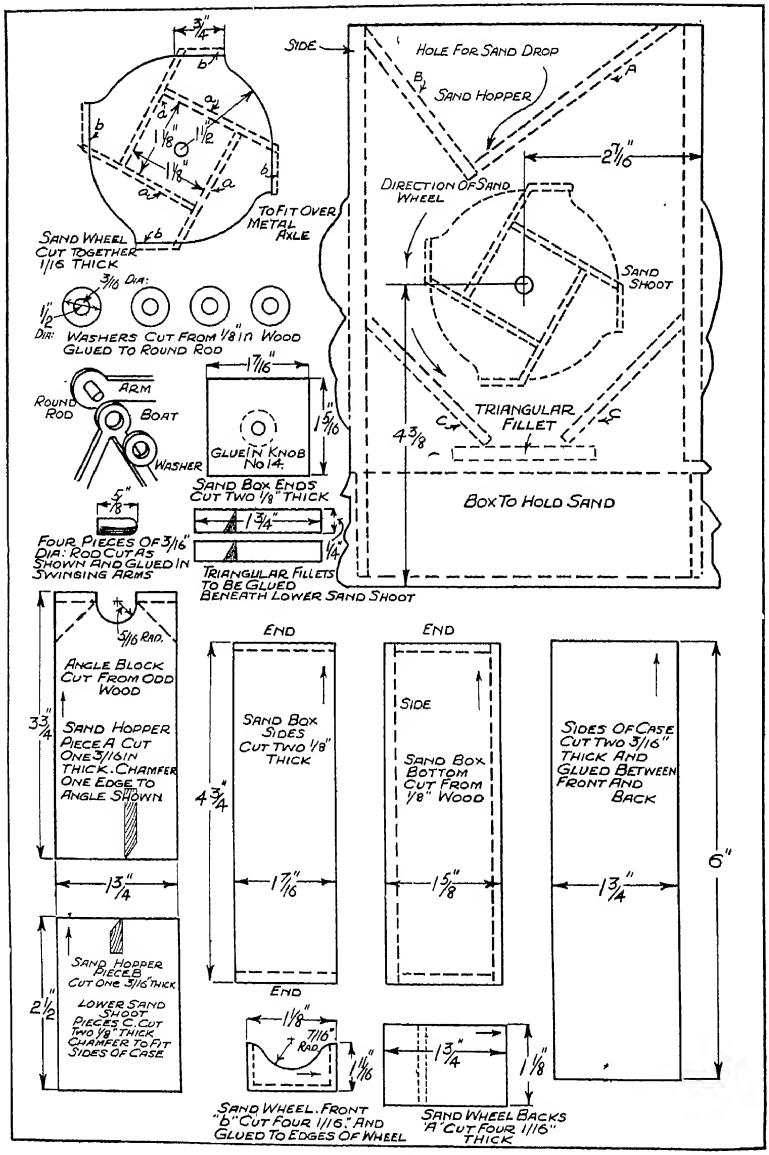


FIG. 3

—IN THE WORKING SAND MODEL

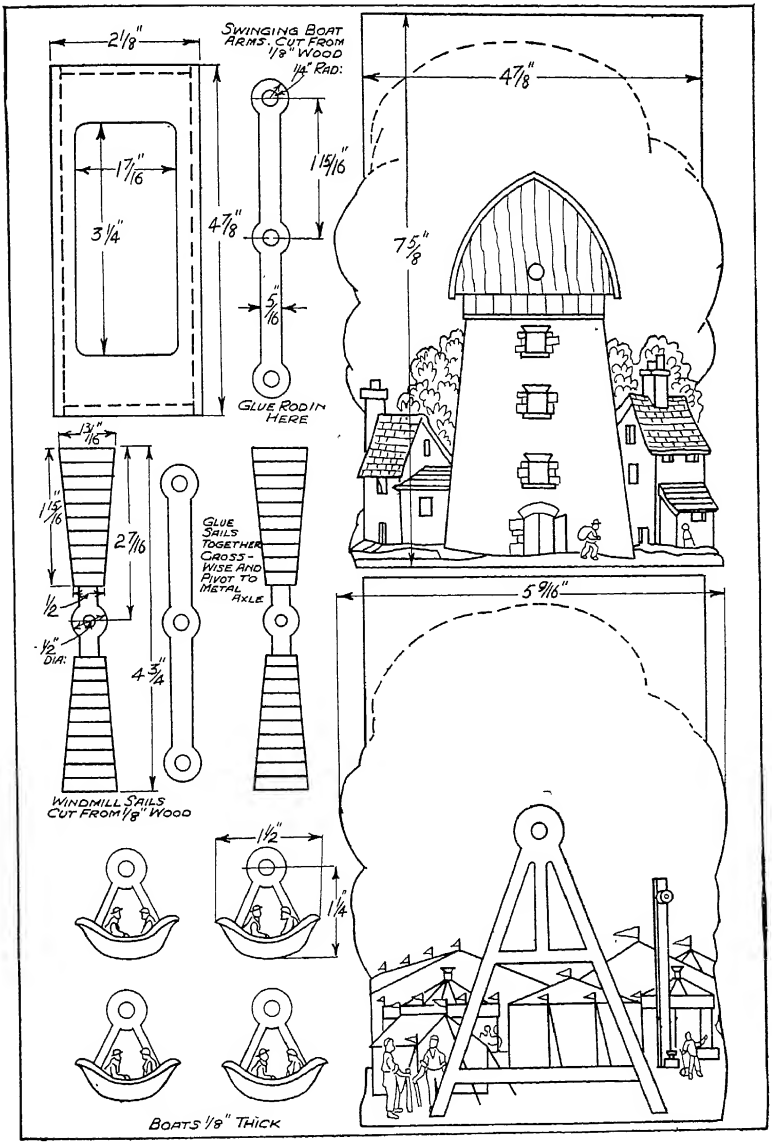
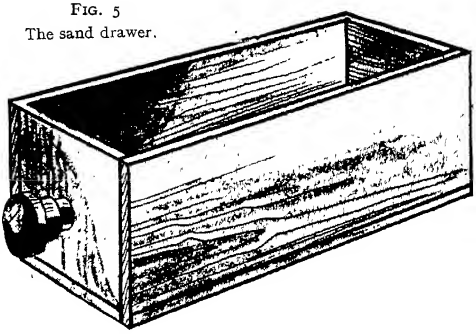


FIG. 4

FIG. 5
The sand drawer.



C which form the chute. When the sand has left the box, it runs down this chute into the drawer at the bottom. This drawer can be taken out, and the sand returned to the hopper above. The two chute pieces can be seen in Fig. 3, and—as in the case of the hopper—fillet pieces are glued to the back and front to carry the sand towards the central hole. These fillet pieces are cut from $\frac{3}{16}$-inch wood, and have the top face sloped down towards the hole before they are glued in place on the back and front. A picture of the drawer into which the sand falls is shown at Fig. 5. It is made of five parts all cut from $\frac{1}{8}$-inch wood. The two sides are glued on the bottom, and then the two ends put between. Little corner blocks can be added inside if required to give strength. Each end of the drawer is provided with a small knob to make it easy to take out from the model. In constructing the drawer, see that it will slide through the aperture in the sides before finally gluing it together.

The Sails.

The movable sails of the models (Fig. 4) are, of course, fixed to the spindle which passes through the sand wheel already made up. This spindle projects at the back and front, and is held in place by a metal washer screwed on. On the outside of this washer, both at the back and front, are the sails and arms which revolve. In the case of the mill, they are merely two plain pieces glued together at right angles and held on the spindle by being forced on through the central hole.

The swinging-boat arms are completed in the same manner, but have the addition of the loose boats which hang at the ends of them. At the end of each arm is glued a $\frac{1}{2}$-inch length of $\frac{3}{16}$-inch round rod. The swinging boat itself hangs on this rod, and must have the hole cut at the top sufficiently large to allow it to swing easily as the arms rotate. The boat is prevented from slipping off by a small wooden washer cut from $\frac{1}{8}$-inch wood and glued to the end of the projecting rod (see Fig. 3). When the arms go round, the weight of the boat should be sufficient to keep it always level. A realistic effect is obtained if the picture is coloured in with water paints or poster colours.

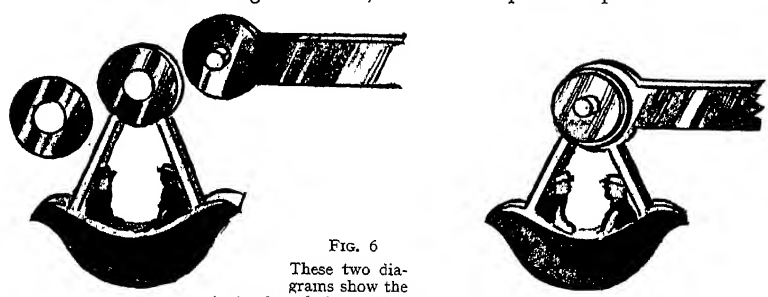
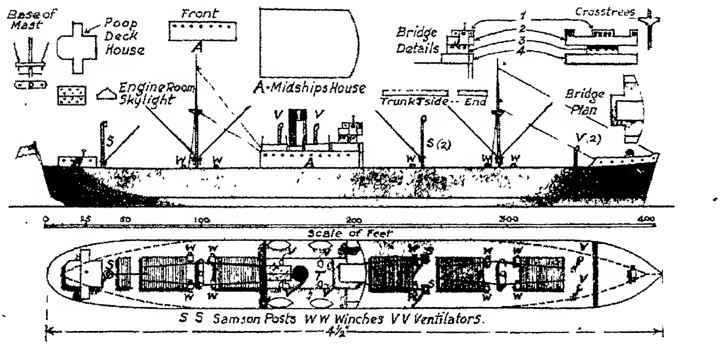


FIG. 6
These two diagrams show the swinging boat before and after fixing to its arm.

MODEL SHIPS YOU CAN MAKE



Drawing specially prepared for this work.

FIG. 1.—How to build the model cargo steamer.

MODELS of ships are most fascinating, and it is possible to have a whole fleet merely for the trouble of making them. In the windows of many of the principal shipping companies are large and perfect models of vessels owned by those companies. These are costly, constructed by skilled workmen with tools specially made for the purpose, and they are accurate down to the smallest detail.

Tests Made by Model.

At exhibitions you can often see model ships at their very best. Many of them are made on a scale $\frac{1}{4}$-inch to the foot, or $\frac{1}{48}$th real size and it is wonderful how effective the skilful work of model makers appears, especially when tall-masted sailing ships are constructed.

Actually, models play an important part in shipbuilding and before a mighty vessel is ordered from the shipwrights a scale model is made and tried out in a huge tank. The tests show better than anything else could do the results likely to be obtained from the finished craft.

Some small-scale ships are quite 6 feet long; but, with materials which everyone has at hand, models 6 inches long and less can be made, not quite so detailed but giving a very satisfactory representation of the full-sized craft.

The materials required are: small pieces of straight-grained wood, glue, pins, paint, fine wire, a sharp knife, some glasspaper and plenty of patience. Select the ship you wish to model. Suppose that it is the cargo steamer illustrated in our coloured plate. This is a common type of modern merchant ship which sails the Seven Seas carrying all kinds of goods wherever they may be found, perhaps 400 feet in length with a beam or width of 54 feet and a tonnage of 9,000 deadweight. We, however, are only concerned with what can be seen of the ship, so that anything below the waterline does not matter. As for the drawings, they are to scale and the scale of feet is shown immediately underneath the profile, giving measurements down to 10 feet.

Making a Start.

Select a piece of wood of suitable length and breadth and see that it is perfectly flat, with the edges straight. With tracing paper and a sharp pencil trace the outlines of the profile from the outline in Fig. 1 and also that of the plan, and transfer these to the sides and top of the piece of wood with the aid of carbon paper, using a hard, finely pointed pencil for the purpose. Now cut the wood to conform to the shapes you have traced and remove any roughness with a small piece of glass-paper. If you have a fret saw this will save a lot of trouble, but it is not necessary.

Trace also the shapes of the deck fittings on thin wood, such as the deck houses, boats and funnel. Using a small finely pointed brush, paint the hull with oil colour, thinned with turpentine or water colour. The illustration shows the colours to be used. The deck houses ought also to be painted and both the hull and deck houses allowed to dry before the fittings are glued to the hull. A better finish will be attained if two very thin coats of paint are given instead of one thick one. The masts are long pins, such as those used for Flag Days, fixed points upwards, having cut off the heads, and these should be put in the positions indicated before the other fittings. A small pin vice holding a very fine drill is useful for boring holes in models of this scale.

The shorter Sampson posts should also be made of pins or wire cut to the

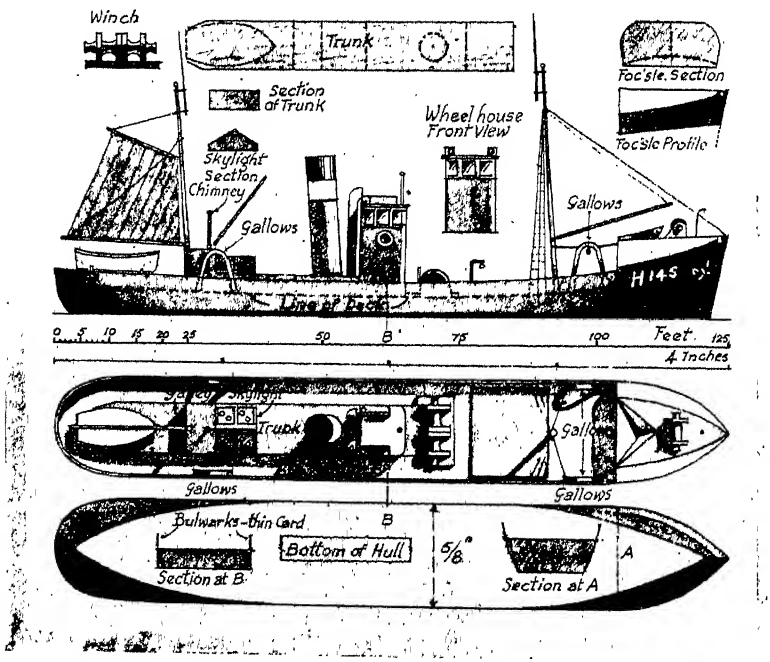


FIG. 2.—How to make a model steam trawler.

required length. The derricks, constructed of fine wire, should be put in position last of all. Use any good liquid glue sold in tubes, though a waterproof glue is best, as it is impervious to damp. Be sparing with glue and use a sharply pointed match stick with which to spread it. If you have tweezers you will find them very useful for placing the fittings in position. When using fingers only, glue gets on to very small fittings, and they become most difficult to handle. Build up the charthouse and bridge in the order indicated in Fig. 1; and, unless your eyes are very good, a small pocket magnifying glass will be helpful in getting everything correctly placed. The hatches (painted black) may be cut from veneer or merely painted on the deck.

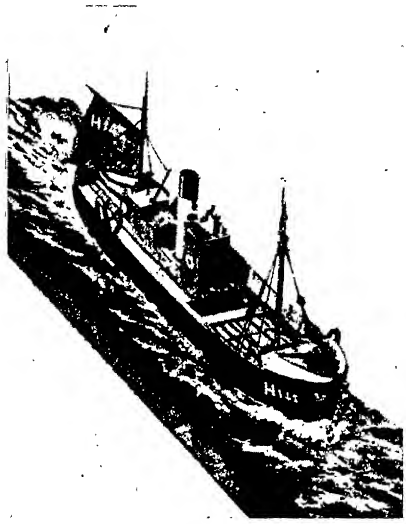


FIG. 3.—A photograph of the model of the trawler made by the author. The ship is four inches long and is mounted on a base seven inches long The sea is Plasticene painted.

Mounting the Model.

Now, if you have paid careful attention to scale, the model is complete, but if you like to go further and make the ship into a picture model Fig. 3 is an example. Mount the model on a piece of plywood about twice the length of the ship—9 inches long and 3 inches wide—or larger than this if you like. Cut from plywood a piece for the back, and two pieces, one for each end and a piece the same size as the base for the top. Using green or grey Plasticene, model the sea very thinly round the ship, painting it with thin oil colour in green and blue, and white for the bow wave and crests; then cut a piece of stout paper, and, before putting it into position, paint an appropriate sky in water colour and a distant coastline. A tiny piece of cotton wool pulled out and rubbed in soot may be glued into the funnel.

Fix the sides and back with panel pins, glue to the base and then place the background in position, bending the two ends round so that they leave no corners. The underside of the top should be painted blue like the sky, before it is fixed in position, and one must remember that it may be seen from a low view-point. Finally, a piece of glass cut exactly to the size of the case will give a good finish to the model and, of course, keep out dust. This can be fixed with passe partout.

The second ship illustrated, Fig. 2, is a steam trawler, not much more than a quarter the length of the tramp steamer; and, because on a larger scale, less difficult to model. Vessels such as these bring us fish from within the Arctic circle; and, although so small, they weather the most violent gales and stay away for long periods from their home ports. This ship is 125 feet long, has a beam of 23 feet and a gross tonnage of 270. In this case the ship has a sheer, *i.e.*, the deck is not level from end to end, and to give

the craft her true appearance this should be shown.

The best way to bring this about is to ignore the forecastle (see details), treating it as a separate piece and shape the deck itself first, so that the forecastle can be fixed afterwards. At this scale it is possible to put a lot of detail into the model. For example, the bulwarks can be cut from thin strips of Bristol board and glued in position. The rigging also might be attempted. In the Napoleonic wars many elaborately rigged ships were modelled by prisoners of war and in some of the very small models human hair was used for the rigging.

Modelling Sailing Ships.

A case for this model (Fig. 4) might well be larger than that for the tramp steamer and should represent a fishing ground, the model in the foreground, with other trawlers fishing in the distance. A rope from each of the gallows would show the trawl down. Fig. 2 shows plan and profile, and details of the trawler, all of which can be traced so that the model will be to scale—scale being of vital importance if a satisfying effect is to result. These two ships are comparatively easy, but more difficult and complicated ones can be attempted when some practice has been obtained.

Working drawings of many well-known ships are available, and it is a simple matter to reduce these to the scale required, whilst the more elaborate might be worked to a slightly larger scale. An excellent test of the quality of work is to take a photograph of your model and compare it with a photograph of the real ship. Sailing vessels are, of course, the most difficult because of the wealth of spars and rigging. Close study of originals is essential, but the subjects for water-line models are endless.

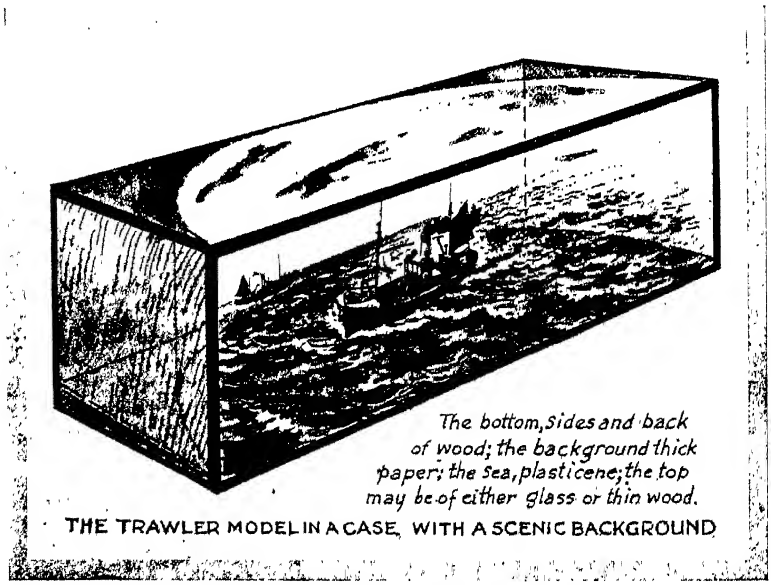
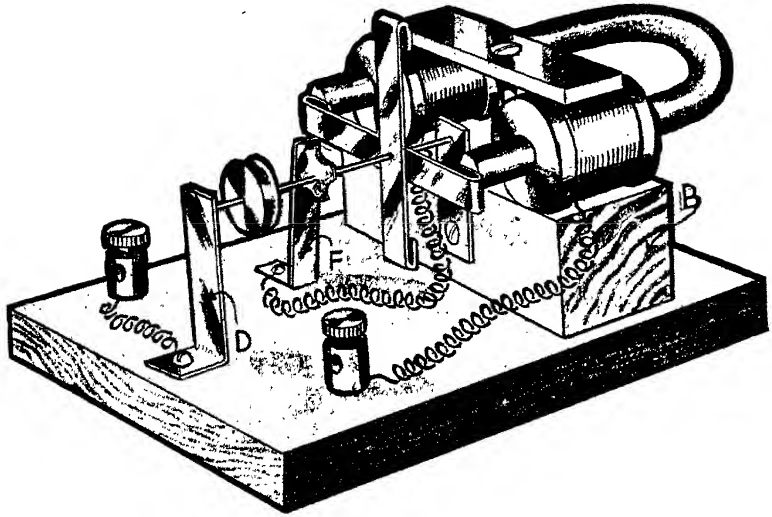


FIG. 4.—A case for the model trawler.

A SIMPLE ELECTRIC MOTOR



THE MOTOR ASSEMBLED

Here is another model which, though made up from the most commonplace materials, will work efficiently provided the instructions given below are carefully followed. The magnet is made from a large iron staple.

THIS little motor, made of extremely simple materials, will work very satisfactorily if the various parts are carefully put together. It consists of an electro-magnet at the ends of which an armature, in the form of a cross, is caused to rotate. By means of a contact-breaker on the armature shaft, the circuit is broken at the right moments so that the armature revolves continuously, and at a rapid rate, while connected to the battery. It will drive your models, too.

The Electro-magnet.

First of all obtain a stout iron staple, such as can be purchased from an ironmonger's shop for about twopence. Get one about 3¼ inches long and 1¼ inches wide so that when the points are cut off with a hacksaw, the magnet will have the dimensions given in Fig. 1. The ends of the magnet must be filed smooth and flat.

You will notice on referring to the illustration given above that the magnet has two coils of wire, one on each limb. The wire is wound on bobbins, which are made by wrapping a strip of thin brown paper, 1 inch wide, round each magnet limb and sticking the edges down with glue so as to form two paper tubes. Now make four washers of stiff cardboard or thin fretwood and glue one of these on to each end of the tubes. One of the finished bobbins is shown in Fig. 2. Fig. 3 indicates the direction of winding.

Winding the Coils.

After the glue has set, proceed to wind the magnet coils, using No. 26 gauge double cotton-covered copper wire. About 6 yards of wire will be required for each coil. Wind on the wire as closely and evenly as possible, and when half the wire has been wound on one bobbin, tie a piece of strong thread round the last two turns to keep

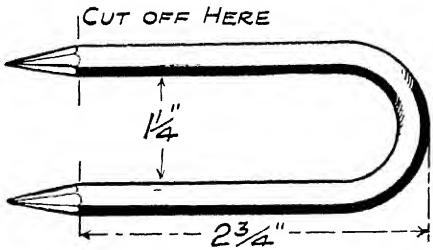


FIG. 1

The staple to use for the magnet showing the portions to cut off.

the wire from unwinding. Now cross the wire over and wind in the reverse direction on the other bobbin. Leave about 8 inches of free wire at each end for connecting-up purposes. You will see by Fig. 3 how the wire is crossed over from one coil to the other. Make sure of this.

Armature and Spindle.

The armature can be made next, and for this cut two strips of thick tinplate (A, Fig. 4) and round the ends with a file. In the middle of each strip drill a small hole, bend over the ends and pinch together with pliers.

Now prepare the armature spindle, which may conveniently consist of a 2-inch length of ordinary steel knitting needle with the ends filed conical. Press the armature arms on to the spindle at ½ inch from one end and at right angles to each other. Adjust them carefully at right angles to the spindle and solder them in position. The little contact-breaker (E, Fig. 5) can be filed to shape from a piece of sheet brass ⅜ inch square, a hole being drilled in the centre a tight fit to the spindle. Round the corners carefully with a fine file, and then press the contact-breaker on the spindle about ¼ inch from the back of the armature, soldering it into place as explained later.

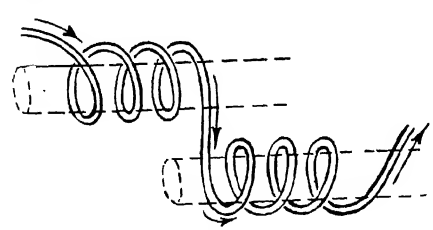


FIG. 3

The two bobbins should carefully be wound in opposite directions, as shown here.

Baseboard and Bearing Plates.

At this stage it will be as well to prepare the baseboard. Plane a piece of wood 5 inches long by 2¾ inches wide, and ⅜ inch thick, and bevel the top edge all round. A rectangular block of wood, B (p. 327), can also be made for supporting the magnet. This block, which is 2 inches long by 1¼ inches by ⅞ inch, can be fixed by two screws driven in from underneath the baseboard.

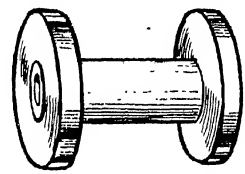


FIG. 2

How to make the bobbins which pass over the two ends of the staple.

From a strip of thin sheet brass ⅜ inch wide and 3⅛ inches long, cut off a piece 1 inch long. In this piece drill two holes as shown in Fig. 6, and near the top edge make a deep centre-punch mark. One end of the other brass strip can be bent at right angles on the dotted line after the two holes are drilled in the lower part as indicated. A deep centre-punch mark should also be made near the top end of this plate on the opposite side to that on which the bent foot projects (see Fig. 6).

Assembling the Parts.

Having got so far, we can now begin to assemble the other parts of the motor. Clamp the electro-

magnet firmly in place on top of the block B by means of a thin strip of wood and a stout screw, allowing about $\frac{1}{8}$ inch of the ends of the magnet to project beyond the face of the block B.

The two bearing plates can be screwed in position and adjusted so that the spindle runs quite freely and is parallel to the baseboard. When the spindle is revolving, the bent-over parts of the armature should clear the ends of the magnet by a bare $\frac{1}{16}$ inch, and the magnet can be finally adjusted to bring this right

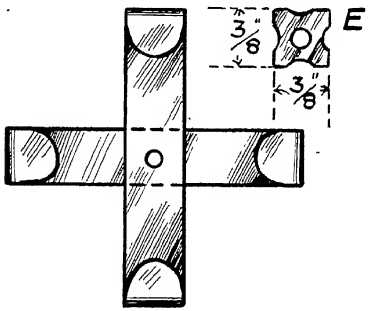


FIG. 5
The completed armature.

by slightly turning the holding-down screw.

We shall now require a strip of very thin, springy brass about $\frac{3}{8}$ inch wide and 2 inches long for the contact brush, F (p. 327), which should be cut to a slight taper. Bend the bottom part at right angles, drill the two small holes, and then screw it down to the baseboard opposite the little contact-breaker, so that it presses lightly against the rounded corners of the latter when it revolves. Take care to see that the corners are quite smooth and that they all make contact with the brass brush.

Making the Connections.

After screwing two terminals in the baseboard, we connect up the wire from

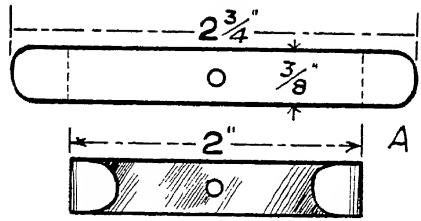


FIG. 4
How to make the armature arm

the magnet coils. The end of the wire from one coil is clamped down under the head of one of the screws which fix the brush to the baseboard; while the end of the wire from the other coil is screwed down under one of the terminals, as shown on p. 327. The other terminal is connected to one of the screws of the bearing D.

The little motor is now ready for connecting up to a battery, and this may consist of two small bichromate cells. After giving the armature a turn to start it, it should revolve at a rapid rate if the contact-breaker is carefully adjusted so that it is just breaking contact with the brush when either of the two arms is directly opposite the ends of the magnet. When the correct position is found, fix the contact-breaker with a touch of solder. If required, a small pulley wheel can be fixed on the shaft.

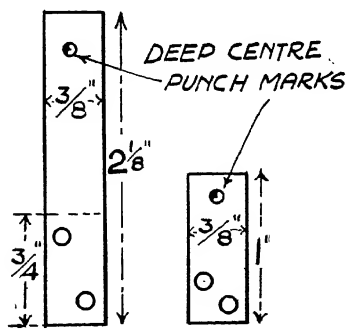
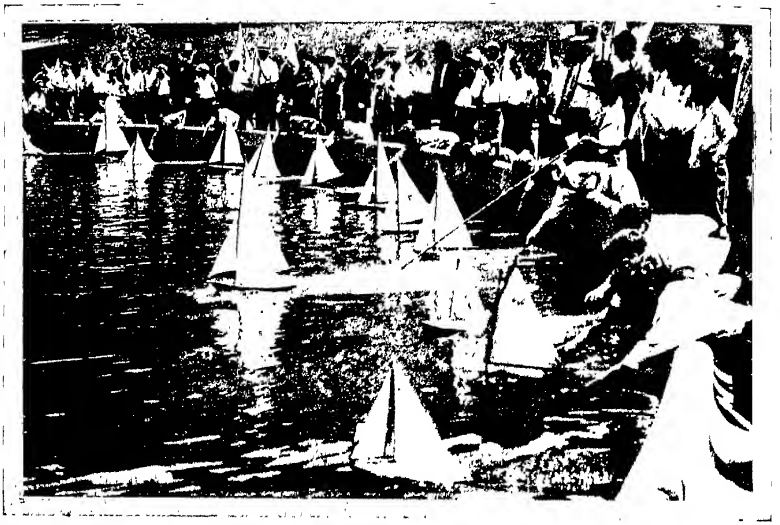


FIG. 6
Details of the bearings.

BOATS AND BOAT BUILDING



MODEL BOATS ON A LONDON POND

Sailing model yachts is a splendid hobby. Safe as well as interesting, the handling of one of these small craft calls for a good deal of skill. In gaining the knowledge necessary to get the best out of a boat, its skipper will soon acquire a sound working knowledge of the principles governing wind and sail.

BUILDING model boats is one of the most fascinating hobbies that any boy can take up. No great skill is required beyond the ability to handle tools moderately well; whereas the pleasure and sport derived from the completed models will well repay all the care and trouble expended.

A Model Sailing Boat.

Here is an easily-made boat which will sail well if care is taken in building it (see Fig. 1).

The hull is made from a piece of wood 9 inches long, 2½ inches wide, and 1 inch thick. Mark a centre line along the top and bottom of the wood and then carefully outline the shape of the hull as shown at B (Fig. 2). With a tenon saw, roughly cut away the parts C, C, and also the corners at the back. Now proceed to carve the hull to shape with a chisel. You will see, by looking at diagrams A and D, what the front and side of the hull should look like when finished. Give the hull a good rubbing all over with glasspaper. To represent planking, the parallel lines along the deck can be scored on with a bradawl, using a ruler as a guide.

For the keel, take a piece of ⅜-inch wood 5½ inches long and 2 inches wide and saw it to the size given at E. Taper the front part at F so that it forms a narrow edge. On each side of the bottom of the keel, nail a strip of sheet lead about ½ inch wide and file this to a round shape. To fix the keel in place, cut a slot ⅜ inch wide along the centre of the bottom of the hull, and after gluing the keel in place, drive in a couple of long fine nails as shown in diagram D.

The Masts, Spars and Sails.

Wooden knitting needles, about $\frac{3}{16}$ inch diameter, can be used for the mast and spars, the lengths of which

are given in the sketch of the finished boat. The bowsprit is fixed to the deck by two wire staples, and the bottom of the mast is pushed into a hole about ¾ inch deep in the hull.

The sails can be cut out of fine white linen to the sizes given, allowing about ¼ inch extra all round for hemming. Use very thin twine for the rigging and attach the ends of the shrouds to small screw eyes fixed in the deck.

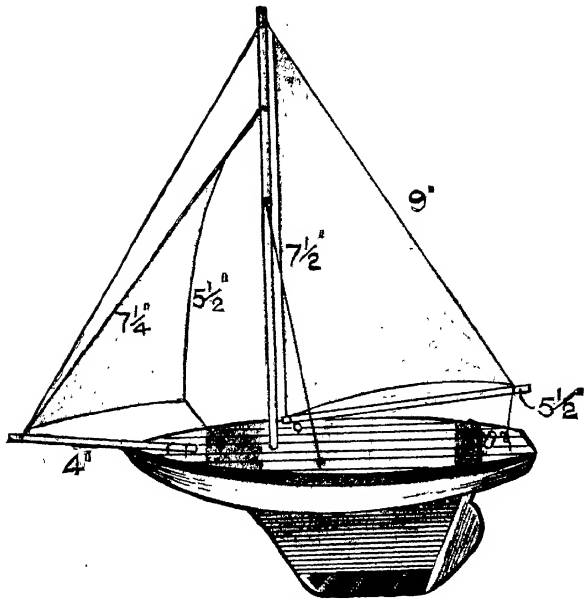


FIG. 1

The model yacht as it appears when the construction is completed.

The Rudder.

To complete the boat, a rudder can be fitted, fashioned out of a piece of $\frac{3}{16}$-inch fretwood to the dimensions given at G, the top part working in a hole in the hull, while the bottom part is held by two wire staples.

Give the hull two coats of white enamel and paint a ¼-inch band of bright red or blue all round the hull. When quite dry, your smart little craft will be ready for its trial trip.

A Model Racing Yacht.

The model yacht illustrated in Fig. 3 is of very simple design, only two pieces of wood being used in the construction of the hull, details

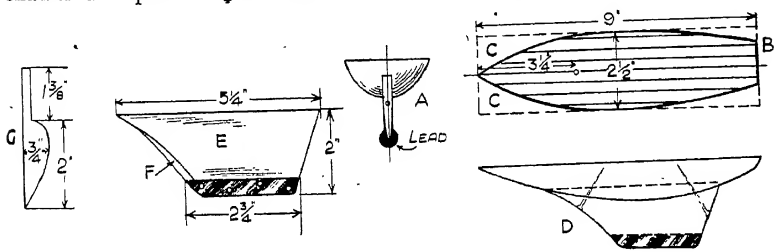


FIG. 2

Diagrams A and D show the front and side views of the hull. Diagram B illustrates the shaping of the hull, while Diagrams E, F and G show the keel and rudder.

of which are shown in Fig. 4. Begin by cutting a cardboard template to the measurements given in Fig. 5. Then select a piece of straight-grained wood 15 inches by 15 inches, and at least ¾ inch thick. Thicker wood may be used, but will mean more trouble in cutting and shaping. Draw a centre line longitudinally upon this piece of wood. Place the straight side of the template against it and run a pencil round the curve; then turn the template over and draw the other curve, thus ensuring balance. Cut round the outline with a fretsaw, and the hull is ready for shaping.

The best tool for this purpose is a small metal plane. Work lengthwise, first rounding the edges, and continuing until the hull is shaped liked the cross section in Fig. 4, but leaving flat a portion along the centre for the attachment of the keel-fin. Shape the bows and the stern with a sharp penknife, and finish off the hull with sandpaper. The keel fin is cut from ⅜-inch wood to the measurements given in Fig. 4, the front and back edges being rounded as indicated by the shading. It is secured to the hull by three 1½-inch brass screws, the heads of which are sunk flush with the deck. Cast a lead keel slightly larger than required and screw it to the bottom edge of the keel-fin, afterwards trimming it down with a file. The rudder and rudder-post are cut in one piece of ¼-inch wood, the post being rounded and a hole bored through the hull to receive it. The lower end is pivoted upon a right-angled brass wire staple as shown by the dotted line (see Fig. 4).

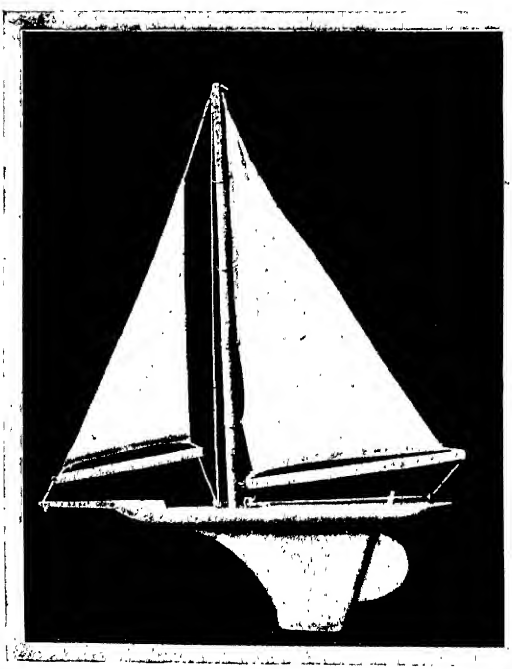


FIG. 3

Here is an actual photograph of a workmanlike model yacht. Cheap and simple to make, this model will give excellent results.

The Mast and Sails.

The mast is 16 inches high from the deck level but is cut ½ inch longer to allow for stepping. Cut it ⅜ inch square, then plane and sandpaper it until perfectly round and smooth. It fits tightly into a hole made at a point on the centre line 5 inches from the bows. The bowsprit is 5 inches long and is secured by two small nails. The mainsail boom is 9 inches long and is attached to the mast by means of a small brass screw-eye and a brass wire as staple as shown in Fig. 4; the other end being rounded and a saw-cut made in it for securing the sail. The jib-boom is 6 inches long and is similar in construction to the main-boom.

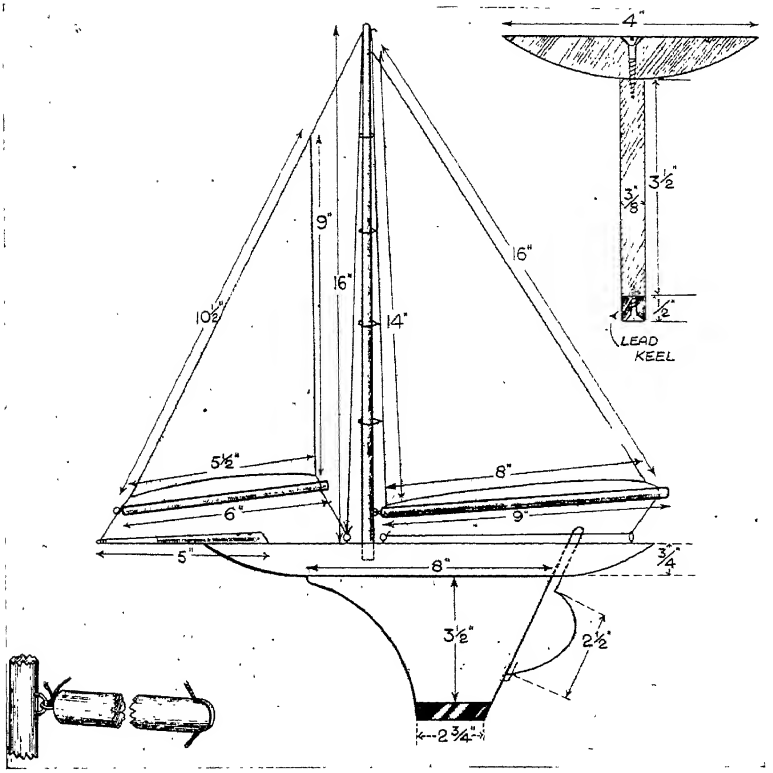


FIG. 4

These diagrams show the constructional details of a model racing yacht. In the centre is the side elevation of the boat, whilst top right is a cross-section of the hull. At the bottom left-hand corner you are shown how to attach the mainsail boom.

The sails may be made from any convenient white material, or the special fabric sold for the purpose may be used. Cut a paper pattern before cutting the material, and allow an extra ½ inch all round for hemming. If you mistrust your powers with the needle, get a female member of the household to do this part of the job for you. Four rings made from brass wire are sewn at equidistant points along one edge of the mainsail, and a length of thin cord is fastened to each of the corners of the sails for attaching them to the spars. The top of the mast has a saw-cut made in it where the cord passes over it, and three brass screw-eyes screwed to the deck at the positions shown complete the yacht.

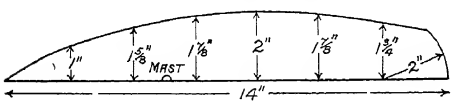


FIG. 5

Cardboard template for the hull.

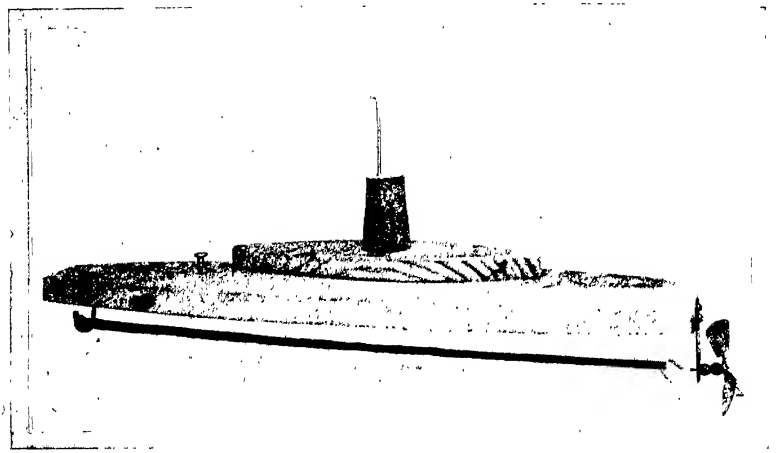


FIG. 6.—ELASTIC-DRIVEN MODEL SUBMARINE

In this photograph you are shown a small submarine that is simple and inexpensive to make. The motive power is derived from the elastic seen under the hull.

A Model Submarine.

A trim little submarine can easily be made in an hour or two from a few odds and ends. The hull and raised deck are of wood, and a cork forms the conning tower, which is surmounted by a periscope, fashioned from part of an aluminium curtain pin or a piece of tinned-iron wire.

The Hull.

For the hull take a piece of wood 10 inches long by 1¾ inches wide, and ⅝ inch thick, and after planing it on both sides, mark a centre line on one side. With a pencil carefully set out the shape of the hull (A) (Fig. 7), saw away the parts not required and finish the sides smooth with a chisel. Now chamfer or bevel the top edge of the hull all round, as shown in the remainder of the sketches. This can be done with a small iron plane and a chisel.

The Deck.

Cut the raised deck (B) from a piece of wood ⅜ inch thick and in the middle of this screw on a cork, which serves for the conning tower. Fix the raised deck to the hull with two ¾-inch nails. The lower end of the periscope is pointed, and is simply pushed in a hole made in the cork with a bradawl. For the bollard, seen just in front of the raised deck, cut off the top part of a French nail, file the end to a point and hammer it into the hull so that the head stands up about ¼ inch.

A piece of thin strip brass can be filed to shape to form the bearing bracket (C), small holes being drilled as indicated. Two small brass screws fix this bracket to the stern of the boat.

The Propeller.

To make the propeller, obtain a flat piece of tinplate, and on it mark a circle 1⅜ inches diameter, and then set out the shape of the propeller blades. With a pair of old scissors cut away the metal not required. File the edges of the blades smooth with a file, and drill a tiny hole through the centre of the propeller to take the shaft. This consists of a 1½-inch length of plated wire taken from a thick bent-wire paper fastener. Lightly solder the propeller on to the end of the shaft, and then

twist the blades so that the outer edge of each one makes an angle of about 45 degrees with the shaft when the propeller is viewed edgewise. Slip a couple of glass beads on the shaft, and with a pair of pliers bend the end to form a hook to take one end of the rubber "motor."

Making the Hooks, etc.

The front hook (D) is made from a blanket pin and is driven into a hole made in the hull. The rubber "motor" consists of 18 inches of $\frac{1}{16}$-inch square rubber strip, the two ends being bound together with strong thread. After placing the strands on the hooks, rub them over with a little lubricant as explained below. All the woodwork of the little craft can be given a coat of grey paint to finish it off.

On winding up the "motor" by means of the propeller, and placing the boat on the water, it will glide along quite realistically until the rubber strands become unwound. The boat rides nicely on the water and does not require a keel of any kind.

By an adaptation of the simple ideas contained in this section, you will be able to make quite a lot of little working models, for twisted elastic is a simple and inexpensive means of driving them.

By the way, for best results you should lubricate the elastic with soft soap, to enable the strands to slide over one another easily, and also to prevent the edges of the strands cutting into one another. Soft soap enables more turns to be given to the elastic skein.

Small tubes of elastic lubricant may be purchased for a few pence from most manufacturers of model aeroplanes. If you decide to use soft soap, use the pure green sort, obtainable from any chemist. Do not use vaseline, or oil, or you will speedily ruin the rubber.

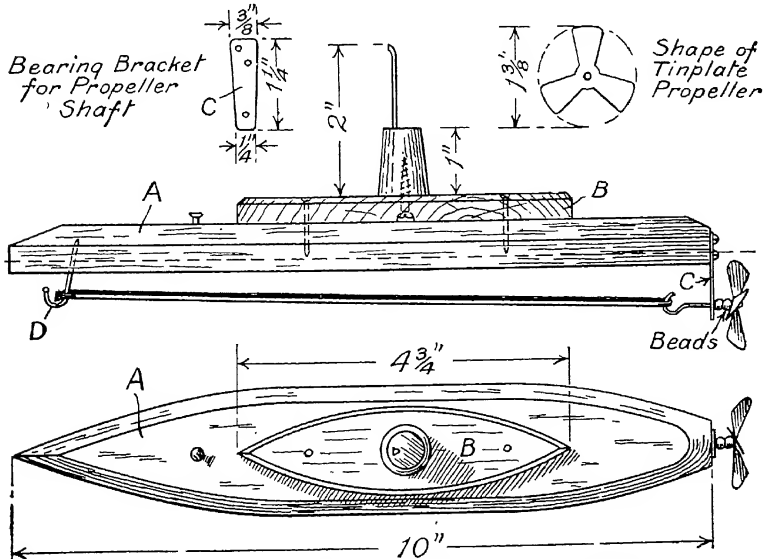
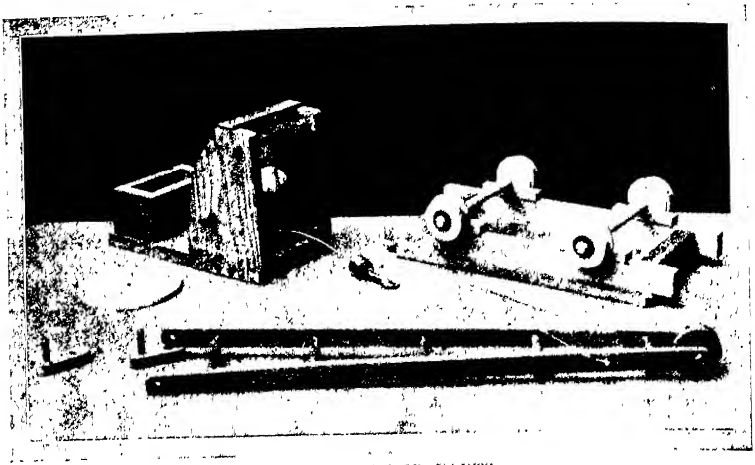


FIG. 7.—CONSTRUCTIONAL DIAGRAMS FOR SUBMARINE

Of the two main diagrams the upper one shows the side elevation and the lower the plan of the submarine. The two smaller sketches show the propeller-bearing bracket which is fitted to the hull at C; and the method of cutting out the propeller itself.

MAKING A MINIATURE ROAD CRANE



THE ASSEMBLED PARTS

This strong and attractive model can be made from inexpensive and easily procurable materials. When completed it will prove a useful addition to, say, a model railway.

THIS strong and instructive toy can easily be made with odd pieces of wood, a cotton reel, and pieces of wooden knitting needles. For the platform (A, Fig. 1) saw a piece of $\frac{3}{8}$-inch wood 8 inches long by $3\frac{1}{2}$ inches wide. Plane it on both sides and around the edges. Cut out four pieces of $\frac{1}{8}$-inch wood to the size given at B, for the wheel bearings. These are screwed to the platform, as shown in Fig. 1, at a distance of $\frac{3}{4}$ inch from each end. Now saw the two side pieces, C C, to the dimensions given at G, and carefully smooth the edges with a chisel. On the centre line of each piece make two holes as indicated, just large enough to allow a thick wooden knitting needle to pass through.

Making the Jib.

To make the jib (D), cut two pieces of $\frac{1}{4}$-inch wood to the shape shown in Fig. 1, and make the holes in each a tight fit for pieces of knitting needle. Cut five pieces 1 inch long, and one piece $2\frac{1}{2}$ inches long. Glue the ends of the short pieces in the holes in the sides of the jib after slipping a boxwood pulley between the top ends of the jib. The long piece passes through the hole in each side piece, also through another pulley F, the rod projecting $\frac{3}{4}$ inch on each side. There should be a space of $\frac{1}{2}$ inch between the jib sides for the full length.

The Winding Drum.

This consists of a deep flanged cotton reel just long enough to fit nicely between the side pieces C C, which are $1\frac{3}{4}$ inches apart when fixed to the platform. Now get a wooden rod or stout knitting needle to fit the hole in the cotton reel, and cut off a piece 3 inches long. Screw one side piece to the platform from underneath, place the jib and winding drum in position, and then screw down the other side piece. To strengthen the sides, screw two pieces of wood (G G) between them at the front and back, and also to the platform. Make the little winding handle (H) out of wood $\frac{3}{16}$ inch thick, and fix one end on to the winding drum

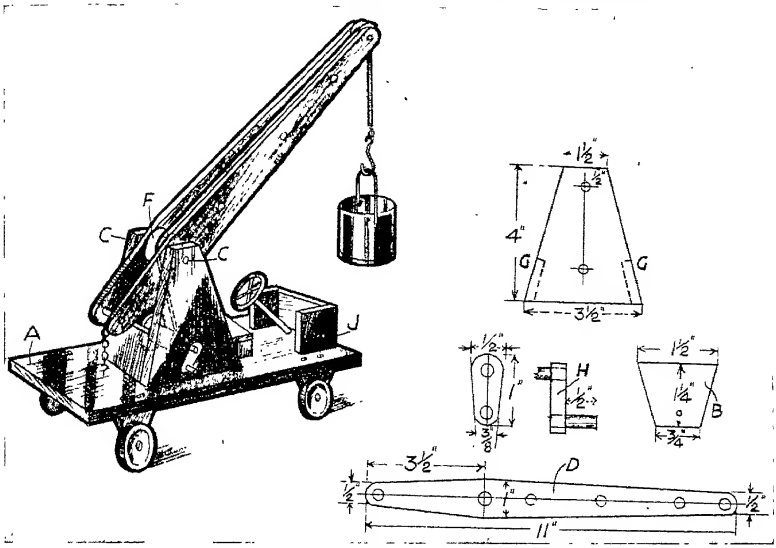


FIG. 1.—The Various Parts of the Miniature Road Crane.

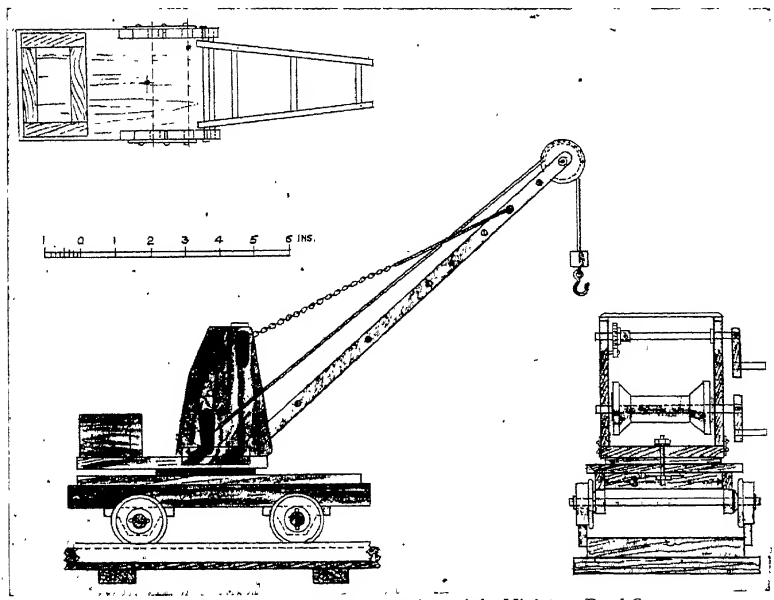


FIG. 2.—Plan, and Side and End Elevations of the Miniature Road Crane.

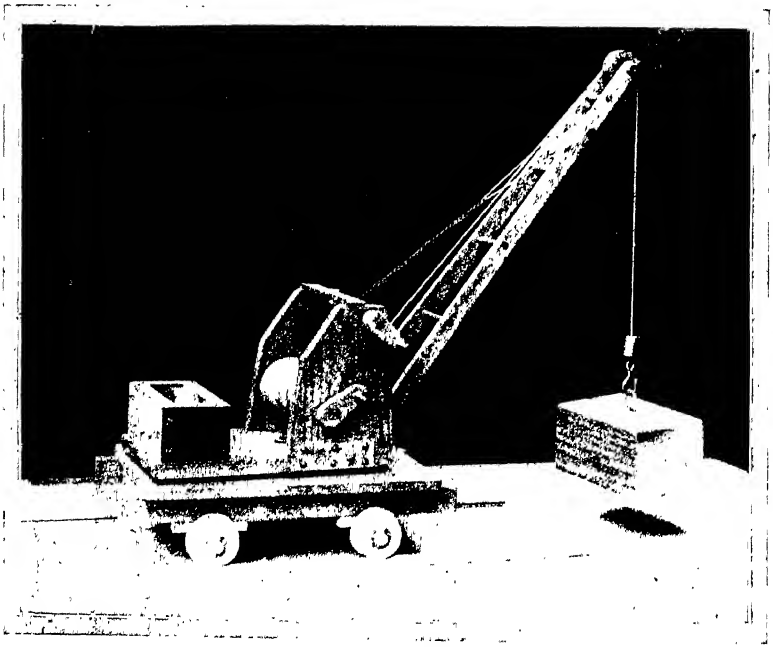
shaft with a small screw, and glue a short piece of round wood in the hole in the other end. The rear end of the jib can be held down by a short piece of chain and a small screw-hook. The front part (J) and the driver's seat can be made from pieces of ¼-inch wood, and are nailed or screwed in place. The steering wheel is simply an iron toy wheel about 1½ inches diameter, screwed on to the end of a piece of dowel rod glued into a hole in the platform. The running wheels are wooden ones, 1½ inches in diameter, and are fixed to the bearing brackets with round-headed screws and washers.

The Finished Crane.

To complete the crane you will require 5 or 6 yards of thin twine, one end of which must be attached to the winding drum and wound up. The other end is passed over the pulley (see Fig. 2), and tied to a small hook, which you can bend to shape from a piece of thick wire. The little bucket can be made from a tin and a piece of bent wire.

The finished toy can be painted with enamel in one or two colours.

Small tins of cellulose paint in a wide variety of colours can be obtained for this purpose. It is recommended that the body of the toy be painted grey, the wheels red, and the arms blue. Cellulose paint is quick drying, but it is inflammable and should therefore be kept away from a naked flame. Use a very soft camel-hair paint brush with which to apply it.



READY FOR USE

This illustration shows clearly what a strong and serviceable model can be made following the few simple and clear instructions given in the text.



Photos specially prepared for this work.

TWO FAITHFUL SERVANTS—YOUR HANDS

Some boys and girls hope that one day they will drive a powerful car, an aeroplane or a motor-boat. It is the ambition of others to ride a horse or excel in playing a musical instrument. You may have the opportunity in the future to do one or more of these fascinating things; but, if you are to become proficient, it is as well to remember that you must spend the waiting time in training your hands. A clever pair of hands is a priceless possession, and in the following pages you are shown many delightful methods of training little fingers to be sensitive and dexterous and useful to you in countless ways.

HANDCRAFTS

LONG ago it was extremely necessary that everybody's hands should be trained to be useful. People who could not use their hands in those days could not have kept themselves alive at all.

Before a child could have clothes, for instance, it was necessary that the father should go out and shoot an animal to get its skin (and before he did that he had to make the bow and arrows).

In some countries it is still necessary for the inhabitants to supply most of their own needs, but even if they spend all their life in a country where it is possible to live without doing so, people who learned when they were young to use their hands are indeed fortunate.

Not only are things made by hand more worth while than those made by machinery, but when a person is interested in handcrafts, visits to museums and art galleries, and travelling in our own and foreign lands, all become means whereby new ideas may be found, and reading and the whole of life thus become more interesting.

A very important thing to remember is that if a child allows his hands to grow up useless he will never be able to train them afterwards. It is only when hands are young that they can learn.

Age 3 Years

BEAD THREADING

Materials :—

Large, Coloured Beads.
Thick Embroidery Cotton.
No Needle.

Method.

This is begun by tying a bead on to one end of the thread. The child should be encouraged to do it himself. He can never have skilful fingers if bigger people are constantly helping him.

The beads should be threaded in any of the designs on this page (Fig. 1), or the child can make up his own designs. Great care should be taken to make them correctly.

When the string of beads is long enough, the two ends should be joined. Bracelets and necklaces can be made as presents.

There is another method, suitable only for older children, as a needle is required.

Thread several beads on to the middle of a cord with a needle at either end.

Add the same number of beads, putting the thread through the row first from right to left, then through the row from left to right. Many good designs may be worked out.

RAFFIA WINDING

Materials :—

Cardboard Ring.
Plain and Coloured Raffia.

Method.

Soak some thick strands of raffia in water for several hours. Take one strand and smooth it out flat. Hold one end of this strand on the front of the cardboard ring with the left thumb (Fig. 2), then wind it over the ring, covering the end with the first wrapping, and making each wrapping overlap the one before it.

When the ring is all covered, the other end should be tucked inside several wrapping strands and the whole kept in place with a strand of coloured raffia tied in a bow (Fig. 3).

Picture frames may be made for the doll's house in raffia. Take a circle of cardboard the size of a saucer, with a smaller circle cut out of the centre. Cover this in the same way as the ring.

A round box may be made by covering a ring and a circle the same size (with a very small hole in the centre) and sewing the ring on to the circle. Another covered circle may be used for the lid.

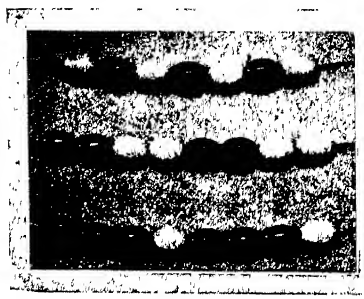


FIG. 1

Here are three ways in which beads may be strung by a small child. If the child prefers to make other number combinations he should do so.



FIG. 2 FIG. 3

Above can be seen the method of starting to cover a ring with raffia. Fig. 3 shows the ring completed. Other things which can be done with raffia are described above.

Age 4 Years

WOOL WEAVING ON CANVAS

Materials :—

A piece of Rug Canvas.
Thick, Coloured Wool.
A Raffia Needle.

Method.

Cut the canvas four squares larger in both directions than is needed for the finished article. Fold over two squares all round to make a neat edge.

Using the wool double, darn in at one square and out at the next all the way across, going through the double thickness at the ends. The second row of darning should cover the alternate squares (Fig. 1).

The darning can be done all in one colour or in stripes, or coloured borders (using the tacking stitch designs) can be worked by older children.

Mats, dolls' carpets, covers for blotters, kettle holders and other useful things can be made.

WOOLLY BALLS

Materials :—

Cardboard.
Scissors with rounded points.
Coloured Wool.

Method.

Draw a circle about 3 inches across on the cardboard, using a cup or the lid of a tin. Draw another circle with a halfpenny in the centre of this. Cut these pencil lines with scissors. Make two of these cardboard circles.

Take several strands of wool. Hold the ends in front of the cardboard with the left thumb and wrap the wool through the hole and over the edges (Fig. 2). Work all round the circle, joining on new wool when necessary. When the hole is nearly filled up, cut the wool as in Fig. 3 on the next page. When the wool is cut, put a piece of strong string round between the two pieces of cardboard and tie it tightly. Pull off the cardboards and trim the ball neatly with scissors.

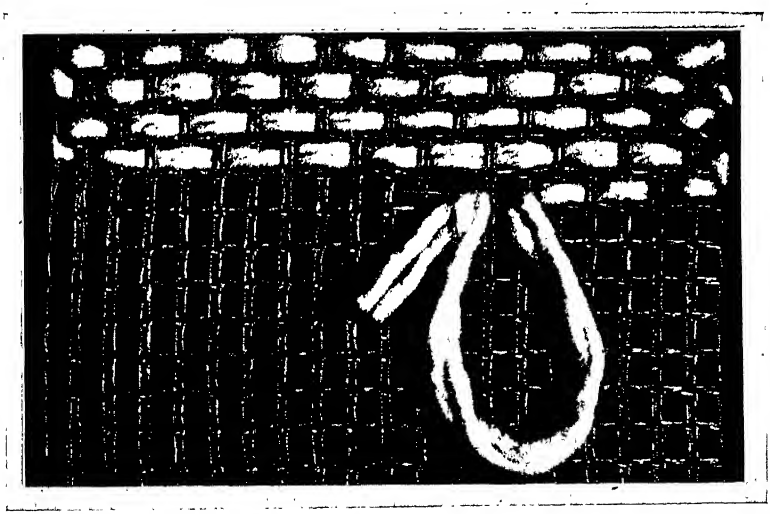


FIG. 1

Above a part of a doll's rug is seen in process of being woven. Thick wool is used, doubled, and a large-eyed blunt needle. The four-year-old should choose his colours himself. He should also have a definite idea of what he is making, and its use, before he begins.

HOW TO MAKE A WOOLLY BALL

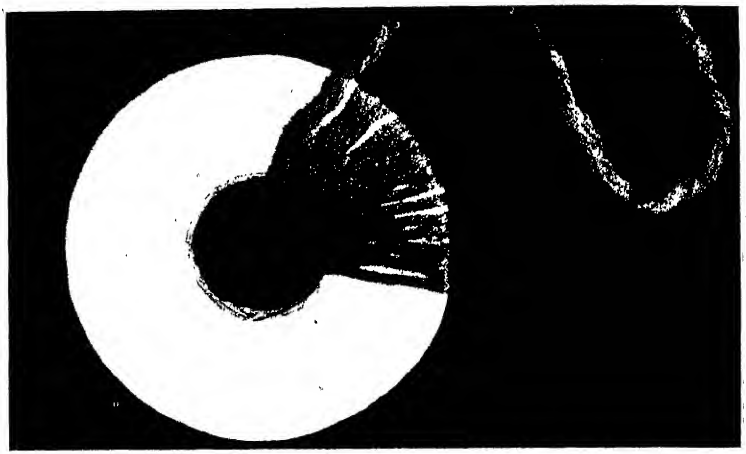
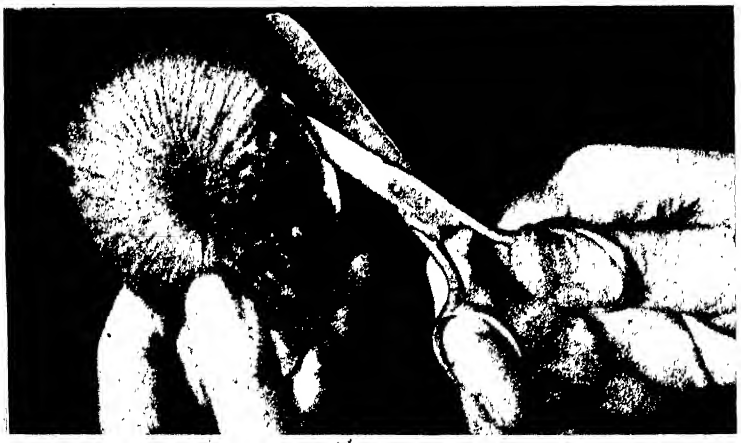


Fig. 2 shows clearly how to start making a woolly ball. One colour, or several different colours, may be used. Older children can get good effects by making each round a different colour, so that the finished ball is striped. If the child makes the ball for a young brother or sister, let him tie it with elastic, leaving a long end which can be fastened to baby's pram. This makes a splendid plaything.



In Fig. 3 it can be seen how the woolly ball is cut. The space between the cardboard, where the string to tie the ball goes, is also seen. Two yellow balls make a chicken. The legs (a piece of millinery wire, bound with yellow wool, with the toes separate) are inserted through the hole in the larger ball before the wool is cut, and the smaller ball is attached for the head. A match and ink spots form beak and eyes.

Age 5 Years

PLAITED RAFFIA

Materials :—

Raffia.
Raffia Needle.

Method.

Take three strands of raffia. Knot them together at the top and pin them down securely with a drawing pin to a table. Take the strand on the right, pass it over in front of the middle strand. It is the middle strand now. Take the strand on the left and pass it over in front of the middle strand. Then the one on the right, then the one on the left.

When the plait is about 2 inches long add another strand to each of the three, and after another 2 inches add a third strand to each to make a thick plait.

When a new strand is added leave the end sticking out (Fig. 1). When each strand is finished, add a new one in the same way. Make a plait several yards long, tie the end and clip off all the loose ends along its length.

Thread a thin strand of raffia on a needle. Wind the end of this round the thin end of the plait and secure it with a stitch. Cut off the knot, and coil the plait round on a table to make a mat. Sew each coil through from the side as in Fig. 2. Do not let the stitches show. Cut the strands off at the other end to make the plait narrow gradually. Finish off by sewing the end down securely and cut off the knot.

Coloured raffia can be plaited in with the other to form a border on the last row or two.

Useful mats may be made in this way, and can be either oval or round in shape.

A simple basket may be made by sewing two mats of equal size together, half-way round, at their edge. The handle can be a raffia plait with the ends knotted and fringed out to form a tassel.

Another shape of basket may be made by sewing the plait round as for a mat until the base is the right size, then raising the side in the method described in Indian Basketry (see p. 351, Fig. 3).

Dolls' hats, and furniture for the doll's house can all be made when the method has been mastered.

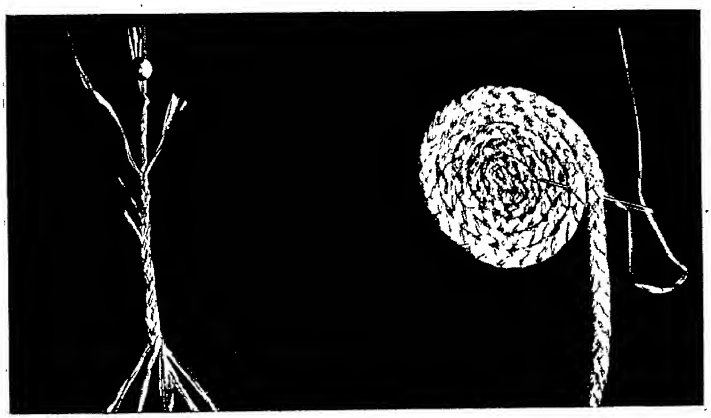


FIG 1 FIG. 2

Fig. 1 shows the start of a raffia plait, with each new piece left sticking out, to be trimmed off afterwards. Fig. 2 shows how the plaited raffia is sewn together. Sew through only two rounds at one time.

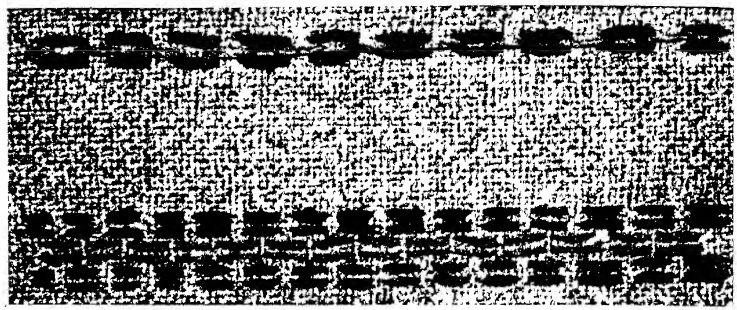


FIG. 3 (top). FIG. 4 (bottom).

Fig. 3 (at the top) is a nice simple design with which to start. The two outside lines should be done first, and the middle line afterwards. For small children, very thick cotton is desirable. In Fig. 4 the rows should be worked from the edge inwards.

SEWING

Materials :—

Crash or any other strong material with a loose weave.
Thick Sewing Cotton in two Colours.
Crewel Needle.

Method.

Thread the needle and make a knot in the other end of the thread. A knot can be made by winding the end of the thread twice round the forefinger of the left hand and taking a stitch through this, pulling it up tightly.

Now start sewing along the edge of the material, making the stitches all the same length, and keeping the space between them the same length. The design marked Fig. 3 on this page is a good one with which to start. Fig. 4 can be done next.

These designs look best with the outside rows in one colour and the middle rows in a different colour.

Handkerchief cases, nursery table cloths, hems of dolls' dresses and table mats can be ornamented in this way. The stitch is called tacking stitch.

If the child finds it difficult to sew on cloth at first, brown paper may be used.

A mat for a hot milk glass is a favourite article on which to begin.

FRAME KNITTING

Materials :—

A Knitting Frame.
Thick Wool or Twine.

Method.

A small frame for making reins can be made from an empty reel. Knock six tin tacks round one hole leaving most of the tack standing up. Larger frames can be made on the same principle, provided there is a space in the middle for the knitting, or the frames can be bought ready made, with wooden pegs instead of tacks.

Make a loop on the end of the wool. Slip this over one of the pegs. Now wind the wool round each peg in turn, taking it round the back, across the front, round to the back again and on round the back of the next peg. Wind it all round twice. Slip the lower stitch over the top of the other and off the peg on the last peg to be wound. This keeps the work from unravelling. Now slip the lower stitch off on each peg all round. Wind another row of stitches and slip off as before. Continue until the knitting is as long as required (Fig. 5).

Break the wool off about half a yard from the last stitch. Thread it on a

needle and take each stitch off the frame in turn with the needle, pulling the wool through.

The end can either be finished by pulling the thread up tightly and fastening the wool, or it can be left flat and the two sides sewn together. If a bag is to be made, make a cord with which to pull it up.

Scarves, caps and tea cosies can be made in wool.

Bags for tennis balls or golf balls can be made in twine.

To Make Cord.

If one yard of cord is wanted, cut four strands (more for a thicker, fewer for a thinner cord) 2¼ yards long. The cord is more even if one person twists at each end, but it can be made by one person alone if the end is securely fastened to a fixture.

Knot the strands at both ends. Twist the strands between the finger and thumb, twisting always away from the body, until they are quite tight (Fig. 6).

Double the strands, holding the twist midway between the two knots (Fig. 7), and knot the cord under the two knots, which should then be cut off.

Cord made in this way is useful for a variety of purposes.

If it is to be used for twine bags it is best made of twine.

Woollen cord is used on a great many knitted garments, with the ends finished with small woolly balls or tassels.

Silk cord is useful for finishing cushion covers, tea cosies, work bags and many other articles. A tassel is the best finish for a silk cord.

To make a tassel, take a firm piece of cardboard the same length as the finished tassel is to be. Wind the wool, silk or twine round this until the tassel seems fat enough. Bind the strands together at the top of the cardboard with the loose end of wool, and cut the strands through at the other end of the cardboard.

Gather the strands in one hand and bind them together again a little below the top. Sew the tassel to the end of the cord, and trim the other end with scissors.

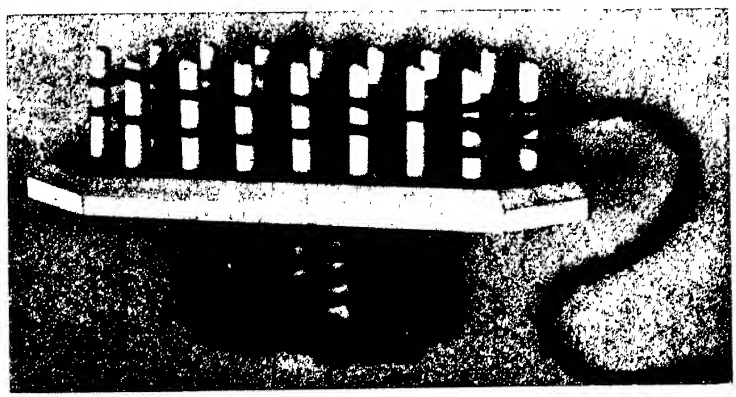
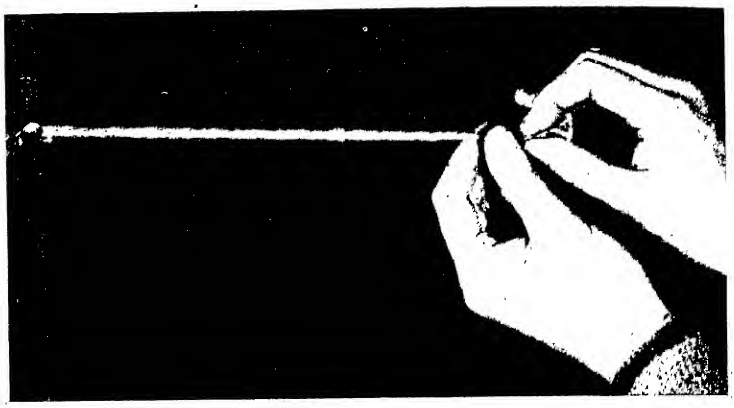


FIG. 5

This is how knitting is done on a frame. The peg that has only one stitch on it was the one that was wound last, so the bottom stitch was taken over the top one to keep the wool from unravelling. The finished part is seen coming out from the space in the middle of the frame. Only thick wool or string should be used on a large frame.

MAKING CORD



In Fig. 6 a cord is being made by one person. After the end has been firmly fixed the strands are twisted to the right. Cords of any thickness may be made, from quite thin ones of sewing cotton or silk to thick ones in wool. The thin cords, sewn along an edge of material, make very good button-holes if little spaces are left free at equal distances between the sewn-down parts.

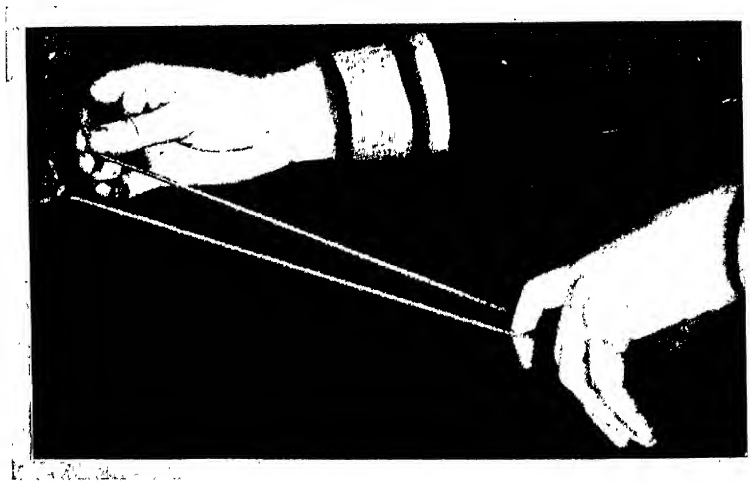


Fig. 7 shows the strands twisted and doubled, ready to be tied. Great care must be taken to hold the twist with the left hand mid-way between the ends, as is shown in the picture, otherwise the cord begins to twist in the wrong place and is never quite so even afterwards. Different colours may be used in one cord, or strands of silk and wool, or silk and cotton look well.

Age 6 Years

SEWING

Materials :—

Cotton or Woollen Material.
Thick Wool or Cotton Thread.
Crewel Needle.

Method.

This is the same as before, but now stitches that go up and down as well as those that go across can be learned. The designs in the illustration (Fig. 1, p. 348) are not meant to be copied. It is more interesting for the worker to make up her own designs.

When the article to be made has been decided on, choose the material and the colours of silk and wool to be used, then draw several designs in coloured chalks on paper and choose the one most suitable for the purpose intended. The designs in Fig. 1 will give some ideas.

These paper designs may be used as friezes for the doll's house, for covering cardboard boxes or for other decorative purposes.

Practice will thus be gained in making designs to fit corners.

It will also be a good way to gain ideas of colour harmony.

Even after the selection of colour has been made, the choice of which is to be used as background and which as decoration is still important. A safe rule is that the brighter the colour, the smaller should be the space it occupies. If we look at the world out of doors we find that the large spaces are filled with browns and greens, whilst the scarlets, bright yellows and purples have only a small place.

Shoe bags, tray cloths, curtain ends, chair-backs and cushions can all be ornamented in this way.

WEAVING ON A FRAME

Materials :—

Stiff Cardboard.
Ruler.
Pencil.
Scissors with rounded ends.
Thick Wool in two Colours.
Crewel Needle.

Method.

First make the Loom on which to Weave. Cut a firm piece of cardboard $7\frac{1}{2}$ by 9 inches. Lay a ruler along the top (short end).

Put a mark at 1 inch and another mark at each $\frac{1}{2}$ inch until $6\frac{1}{2}$ inches is reached (12 marks in all).

Now measure $\frac{1}{4}$ inch down from the top on each side and make a mark. Draw a line to join these marks.

On this second line put the first mark at $1\frac{1}{4}$ inches and another at each $\frac{1}{2}$ inch until $6\frac{1}{4}$ inches is reached.

Draw a line from the first mark on the top line to the first mark on the second line and another from it to the second mark in the first line. Do this until all the marks are joined.

Turn the cardboard top to bottom and mark the second end in the same way.

With scissors, cut the marked notches out of both ends of the cardboard.

This is the loom. (See Fig. 2, p. 349.)

To Make the Shuttle.

Take a piece of cardboard 8 by 1 inches.

Cut a notch 1 inch deep at each end, and a little slit in the side of one of these notches.

To Thread the Loom.

Take a ball of wool. Leave about $\frac{1}{2}$ yard of wool at the back of the loom. Bring the wool forward at A. Pass the wool down the front of the loom, round the first point at the bottom, back across the front and round the second point at the top. Continue this until all the notches are full. There should be eleven strands across the front of the loom and no wool at the back except the loops round the points between the notches, and the end to tie.

Take the wool to the back at B. Leave $\frac{1}{2}$ yard and tie it to the piece left at A.

The strands across the front are called the warp.

DESIGNS FOR TACKING STITCH

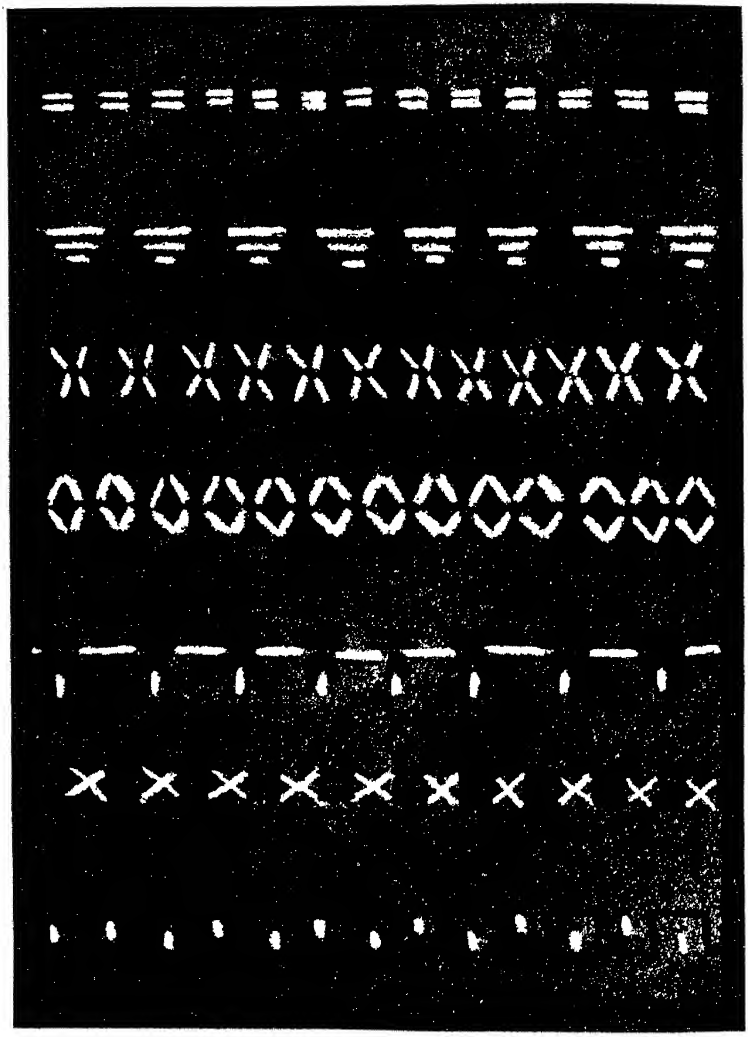


FIG. 1.—These designs for the use of two colours on a third coloured background may be used for other purposes besides tacking stitch. Pottery may be decorated with lines instead of stitches. Wooden boxes, trays, etc., can be painted thus in strong colours, or the designs may be used in weaving and basketry. Some colour combinations that were found good were: black and white on blue, black and yellow on grey, blue and green on grey, and green and coral on a natural-coloured linen.

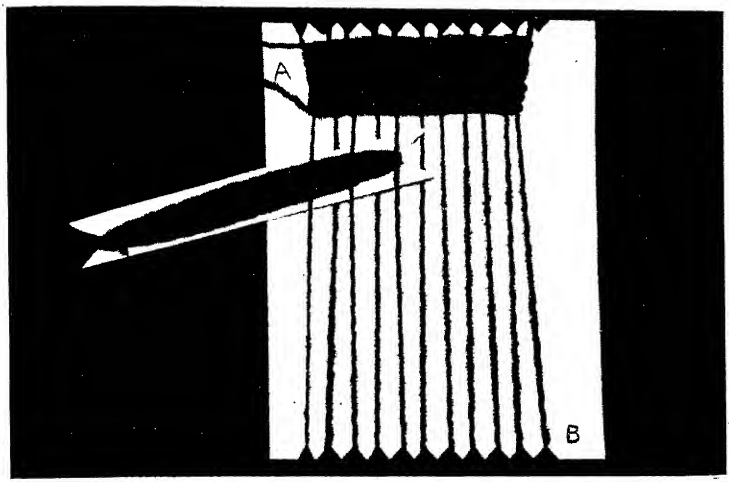


FIG. 2

In Fig. 2 can be seen a loom and shuttle which any child could make in cardboard. On it can be woven dolls' carpets in wool, mats in raffia, tea-cosies in wool, and other useful things. When the process of weaving has been mastered, the child will probably feel a desire to make a larger loom in wood on which more ambitious articles embodying interesting designs can be woven.

To Thread the Shuttle.

Take the other colour of wool.

Secure the end of it in the small slit on the shuttle, and wind as much on to the shuttle as it will hold.

Tie the free end from the shuttle to the piece of wool left at the back of the loom. Now start weaving by passing the shuttle under and over the warp threads as in darning (Fig. 2). Care must be taken not to pull in the end threads of the warp. If this cannot be avoided put a knitting needle down each side and weave it in with the end thread. It can easily be pulled out when the weaving is finished. Continue until the warp is all covered.

The weaving threads that go across are called the weft, or the woof, and the whole fabric is called the web.

Untie the wool at the back and slip the web off the loom. Darn in the short end of weft thread at each end and fill in the loops at the ends either by darning with the long ends of warp wool, or, if a rug is being made, with a fringe.

If a fringe is to be used, cut a number of pieces of wool 3 inches long. Double one piece. Put the looped end through a loop in the rug and pull the two loose ends through the loop (as string is put in a luggage label). Knot one 3-inch piece of wool into each loop.

The web can be woven in patterns by going over or under more than one warp thread, or by using another colour of wool to weave stripes. If the tacking stitch borders have been done it will be found that the patterns in those can nearly all be worked in weaving.

Many things besides dolls' rugs can be woven, such as egg cosies (on a smaller loom), mats or pochettes. Raffia, twine and silk can all be used. Wool woven on a twine or silk warp gives good results.

Age 7 Years

INDIAN BASKETRY

Materials :—

Raffia.
Raffia Needles.

Method.

Take three strands of raffia by one end. Make a loop round the first finger of the left hand with these and tie the strands together, where they cross, with a fourth strand (Fig. 1). Pull the ends until the loop almost closes up. Thread the fourth strand of raffia on to a needle and take four tight over-sewing stitches into the loop. Pull the ends again so that the loop quite closes (Fig. 2).

The long ends from the loop are called the tail. The strand with the needle is called the working thread.

After the loop is closed, take the tail in the left hand and the working thread in the right. Wind the working thread once round the tail, towards the body, then take it over the top and forward again and pass the needle through the centre of the loop. Repeat thus until six stitches have been taken into the centre and the work has again reached the knot.

Now cut the short threads off close to the knot and continue as before, once round the tail, but, instead of inserting the needle into the centre, put it into the space left by the twist round the tail on the first round.

It will be necessary to increase a stitch or two on each round on the base of the basket. This is done by taking two stitches into the same space, winding the thread once round the tail between these two stitches. The extra stitches should be spaced at equal distances on the round.

Add another strand of raffia to the tail once in every round until there are eight strands. (If a very large basket or a tray is being made, add strands until the tail is of the desired thickness.) When one strand in the tail is finished a new one must be added, as the tail must be kept at a uniform thickness.

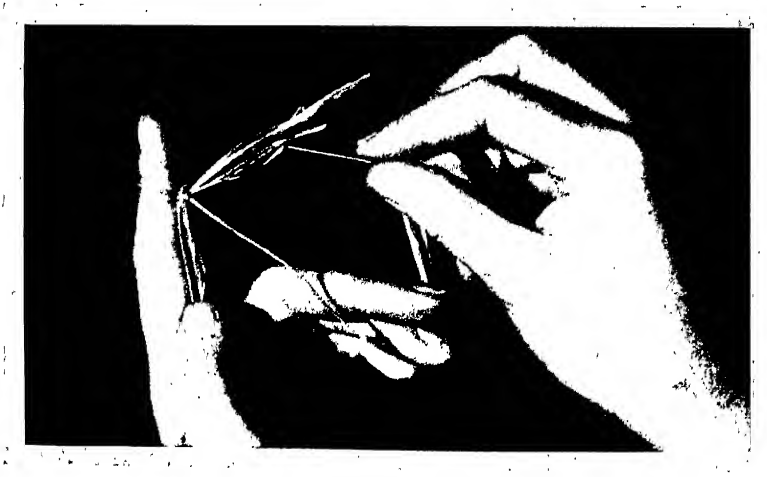


FIG. 1

This shows the first step in making the base of a coiled Indian basket in raffia. It is of importance that this step should be learned thoroughly, as all round baskets are begun in the same way, whatever stitch may be used later, and no basket can be successful without a satisfactory centre.



FIG. 2

In Fig. 2 four stitches have been taken into the loop seen on the finger in Fig. 1, and the ends are being pulled to close the loop.



FIG. 3

This shows how the tail is placed when the sides are to be raised. The tail should be pulled rather tightly while the first round is being worked.

When the working thread is nearly finished, let it be added to the tail and take a new thread. Hold the end of this, with the tail in the left hand, close to the basket and wind it round the tail in the ordinary way.

When the base is sufficiently large, start the sides by laying the tail on top of the last round instead of outside it (Fig. 3).

Continue without adding any stitches until the sides are of the height desired.

On the last round taper the tail by cutting off the strands at intervals until there is only one left. Fasten this down securely and run the working thread back inside the last round for about an inch, and cut both it and the tail strand off so that they do not show.

This method is known as LAZY SQUAW stitch, and is illustrated in Fig. 6.

Another method, which is known as coiled Indian stitch, is illustrated in Fig. 4. In this the working thread is brought forward over the tail and a stitch is then taken through from the back. Now pass the working thread up over the last sewn-down coil, behind and over the tail, and through from the back again. The centre is the same whatever method be used.

One of these two methods should always be employed for the base of the basket, as they are very strong and firm.

Two varieties which may be used for mats, or for the sides of baskets, may be seen in Fig. 5. The light part here is done in coiled Indian stitch, with four twists round the tail between the stitches. The border is done in Lazy Squaw stitch with four twists instead of one round the tail between the stitches.

In working coloured borders like those in Figs. 6 and 7, a coloured strand is introduced into the tail and this is used instead of the working thread for the coloured stitches, the working

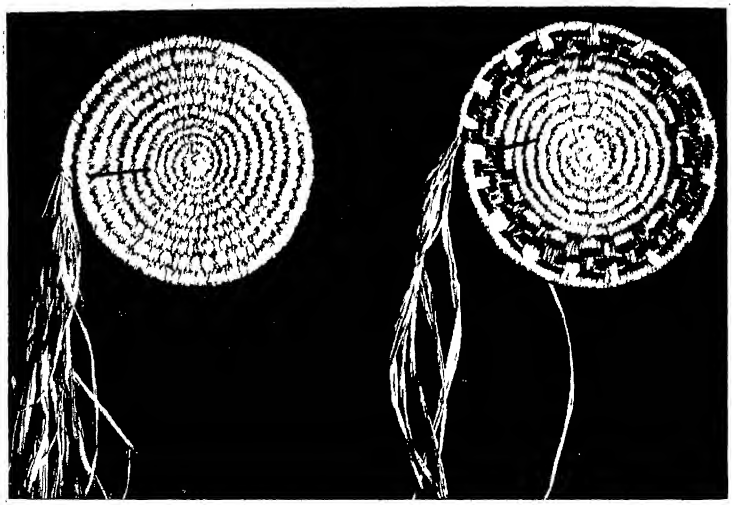


FIG. 4 shows a base in coiled Indian stitch, which is perhaps the favourite stitch of most people. The working thread is wound about the tail and brought through the last-completed round. This makes a firm base.

FIG. 5.—The light part has been worked in coiled Indian stitch with the thread wrapped four times round the tail, and the border is in Lazy Squaw with the thread wrapped four times round the tail.

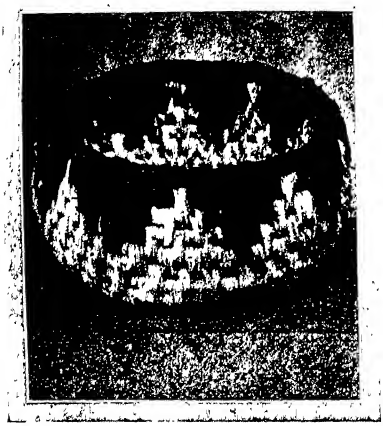


FIG. 6 shows a basket done in Lazy Squaw stitch, with a coloured border introduced. In this stitch the coloured part shows clearly, as the long stitches stand out from the others.



FIG. 7.—Care must be taken to make the spacing even in working a basket of this kind. The stitches on the last row should be counted and the design worked out on squared paper before the side is started.

thread taking its place meanwhile in the tail.

Very interesting designs can be worked out in one or more colours. Ideas for these can be obtained by studying Indian baskets in museums. The Indians dye the materials for these with the bark and roots of various trees, and such natural dyes give the best colours. Boiling raffia with onion skins, old tea leaves, or coffee grounds, and rinsing well afterwards, will give good colours. Walnuts will give green in summer and brown in autumn. Lichens may be gathered on country walks and used to dye raffia. Some give green and some give a lovely yellow. Logwood, used alone, or with alum, with iron or with ammonia, produces excellent colours. Oxblood and cudbear are also useful. These can be had from the chemist, but it is more interesting to find one's own dyeing materials in the woods.

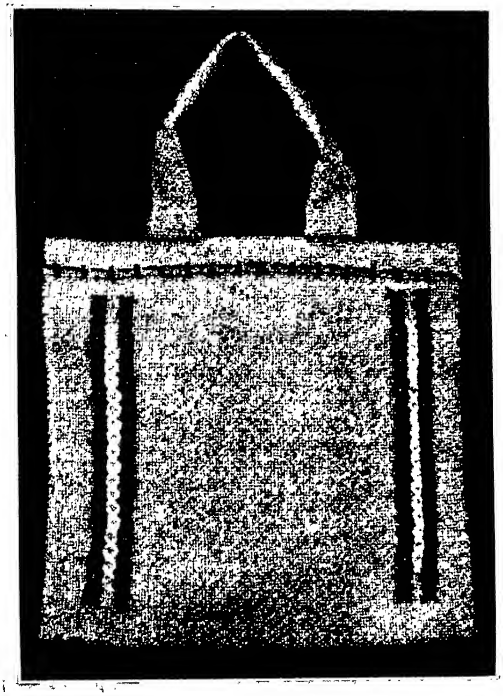


FIG. 8

This is the completed shopping bag described on this and the next page. Strong material that is not too stiff for the passage of the needle should be used—hessian is a good choice.

The Indians of North America make a great many of their household possessions in this basketry. They make cradles, trays and quite large chests with lids; and some of their baskets are so finely woven that they will hold water.

SEWING

Cross-stitch and over-sewing can be done now that tacking stitch has been learned. A shopping bag is a good article to make.

Materials :—

¾ yard Crash, 12 inches wide, with selvedge at both sides.
A piece of Wide-meshed Canvas.
Coloured Wools.
Crewel Needle.

Method.

Cut two strips of crash, each 3 inches wide, across the width of the material. Turn a ½-inch hem to the same side on both edges of each piece. Now fold each strip lengthwise with the raw edges turned in, and tack.

Turn a double hem of 1 inch at each end of the other piece of crash. Tack these down to the right side and sew them on the right side, using coloured wool and any tacking stitches desired.

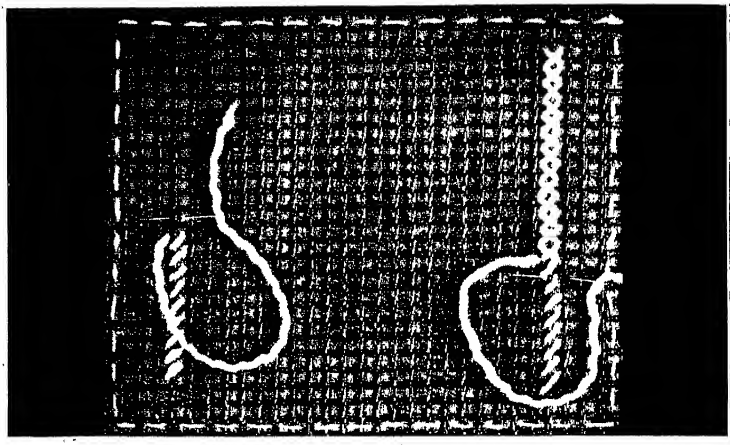


FIG. 9

Here you see the first row of stitches in position. It is most important that all the stitches should slant in the same direction. This applies to all cross-stitch work.

FIG. 10

Above the covering stitches are seen. This illustration shows also how the canvas is tacked on the front part of the bag before the work is begun. It must be firm and quite flat.

Fold the large piece of crash in two, with the sewn hems together.

Now take a piece of canvas the size of the folded bag. Tack it firmly to one-half of the bag on the right side.

In working cross-stitch, bring the needle through from the back in a square near the lower left-hand corner of the canvas, working through both canvas and crash, which is now opened up flat. Count one square up and one to the right and put the needle in again here. Bring it out in the square to the left of the one where it was inserted, count one square up and one to the right, put the needle in, and bring it out at the next square on the left. Continue this until the hem is reached (Fig. 9). All the stitches must slant from right to left.

Now work down from the top and cover all the stitches already made with others slanting in the opposite direction, *i.e.*, from left to right (Fig. 10).

Another row can now be worked in the next spaces on the right, using another colour of wool. Begin two squares up from the end of the first row and stop two squares from the top. A third row in the first colour and the same length as the first row should now be worked on the right of the second row (Fig. 8).

The pattern is next worked at the right-hand side of the bag, and then the threads of the canvas are all pulled out, leaving only the sewing on the crash (Fig. 8).

Tack and over-sew the sides of the bag (for over-sewing, see Plain Needlework section) in one of the colours already used. Over-sew the two strips and sew them securely to the two sides of the bag as in Fig. 8.

Cross-stitch can also be done on loosely woven material, where the threads of the material can be counted and act as a guide. Initials on linen are often marked in this way.

Cross-stitch is used in working tapestry. In this the design is stamped on the canvas or it can be copied stitch by stitch from a chart. The background is filled in afterwards.

Long ago women were fond of commemorating events in this way. They were not taught to draw or paint and this was their only means of pictorial expression. Queen Matilda worked a tapestry representing fifty-eight scenes in the life of her husband William the Conqueror. Mary Queen of Scots and her Maries worked many tapestries of this sort. They were used as wall hangings and may be seen in historical buildings to this day.

Age 8 Years

CANE BASKET WEAVING

Pulp cane is the most suitable material for beginners to use, as long lengths of uniform thickness may be obtained.

For a first basket a very simple shape should be made, so that the whole thing can be done without help.

Materials :—

Pulp Cane No. 6 and No. 3.
A pair of Scissors with rounded ends.

Method.

Soak the cane for one hour. Cut eight stakes 20 inches long in No. 6 cane.

Lay four of these on the table from left to right and the other four on top of them to form a cross, with all arms of the cross the same length. Cut another stake 12 inches long and put it with the stakes at the left hand arm of the cross, with the ends level. Now turn the cross so that the five stakes are at the top.

Take a piece of No. 3 cane. This is called a weaver. Lay the end of it on top and across the four stakes that go from right to left. Weave it under the five at the top, from the left, over the four at the right, under the four at the bottom and over the four at the left. In the second round take it under the odd stake (Fig. 1), over the other four at the top, under the four at the right side, over the four at the bottom and under the four at the left side. Third round, over the odd stake and so on until the weaver comes back to the odd stake again; weaving is always done from left to right.

Pull the stakes away from each other in twos and weave under and over these for three rounds. Now pull them away from each other again so that they are all separate. Be sure that the space between each is the same width.

When the base measures 6 inches across put it to soak again and cut seventeen stakes of No. 6 cane 10 inches long. Soak these also.

Insert one of these stakes at the right side of each of the base stakes, pushing it into the base weaving as far as it will go.

Gently bend all the stakes at right angles to the base, taking care not to crack the canes. Tie all the ends together with string at the top and leave for half an hour.

There is still a weaver attached to the base. Add another weaver by putting it between the two pairs of stakes in front of the weaver already there.

Bring the back weaver over one pair of stakes, behind the next pair and out to the front. Leave it there. Take the other weaver. Bring it over one pair of stakes, behind the next pair and out to the front. This is called pairing (Fig. 2), because it is done with a pair of weavers.

Do three rounds of pairing, then, using the two weavers as though they were one, and keeping the stakes still in pairs, weave nine rounds over one and under one. Working with two or more weavers in this way is called slewing.

Still using the same pair of weavers, do three more rows of pairing and cut both the weavers off inside.

Soak the basket upside down for half an hour.

Take any pair of stakes, and, weaving to the right, pass it behind one pair, in front of the next, behind the third and leave it inside. Do this until all the stakes are woven in, weaving the last pairs so that no join shows.

Cut the ends off close inside.

Fig. 3 shows this basket completed.

TO MAKE A STRONGER BASKET

Materials :—

No. 12 Cane.
No. 8 Cane.
No. 4 Cane.
A Knife and a Bodkin.

Method.

Cut eight base stakes, 7 inches long, in No. 12 cane. Make a split 1 inch long in the middle of each of four of these, using the bodkin (Fig. 4).

Take one of the unsplit stakes and pass it through the cut in each of the four split canes. Put the other three in the remaining space, making a cross.

Take a long length of well-soaked No. 4 cane and bend it, not quite halfway along its length. Hold the base stakes between the thumb and fingers of the left hand, with the split canes pointing up and down. Put the loop in the No. 4 cane over the top arm of the cross, twist the ends once (Fig. 5) and work two rows of pairing.

Open the stakes up into twos and work two more rows of pairing, then open the stakes again so that all are separate and work another two rows in pairing.

Cane weaving is a craft in which great accuracy and attention to detail are necessary. Each stake should point in its proper direction from the start, and care must be taken to maintain that direction throughout.

In weaving, the fingers of the left hand should always be inserted between the stakes, holding the weaver that has just been placed by the right hand. When a new weaver is needed it should be crossed above the end of the old weaver behind a stake, on the inside. It is only by giving great care to such details as these that good, even work can be produced.

The rest of the base is to be done in randing. Randing consists in taking the weaver over one stake and under the next. As the number of stakes in this basket is even, two weavers must be used. These follow each other round, but do not cross as in pairing.

Take the two weavers already in use. Take the one which finished the last row of pairing all round, over one and under one, until the second weaver is reached. Now take the second weaver all round, over one and under one, stopping just short of the first weaver. Continue this until the base measures 6 inches across. The last row must be done in pairing. Cut the weavers off and cross them.

Cut the base-stakes close to the weaving.

Cut thirty-two side-stakes, each 14 inches long, in No. 8 cane. These must be slyped, as in Fig. 6, and then the cut ends put to soak for half an hour.

With the bodkin make a little passage at both sides of each base-stake in turn, inserting the slyped end of the side-stake as soon as the bodkin is withdrawn. Gently bend the side-stakes until they are at right angles to the base. Tie them up and leave them for half an hour.

Upsetting the sides is done with three rows of triple weaving (sometimes called three-rod waling). The principle is the same as in pairing, but three weavers are used.

Insert three well-soaked No. 4 canes. Take the one on the left in front of two stakes, behind one, and out to the front. Always using the cane on the left, continue to do this until the three rounds are completed, taking great care that the stakes are equidistant and that each points in its proper direction.

Work the sides in randing, using two weavers. The basket in Fig. 7 has five rows of three-rod waling to strengthen

CANE BASKET WEAVING (1)

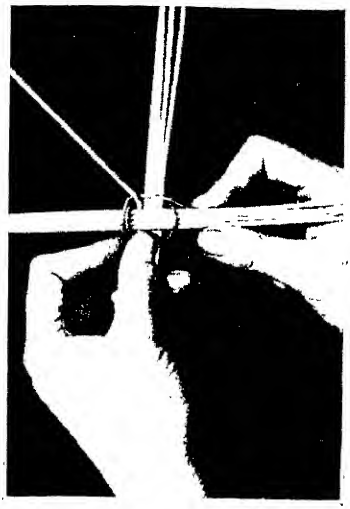


FIG. 1 shows the beginning of a basket in cane weaving Note the position of the odd stake. It remains separate from the rest until the base of the basket is finished

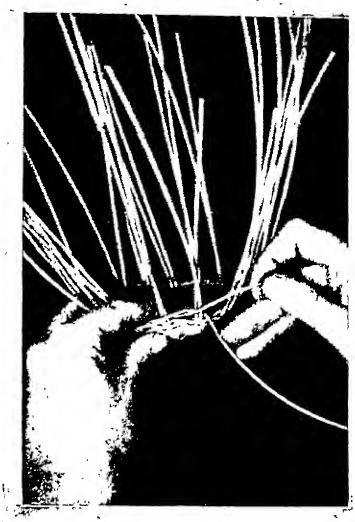


FIG. 2 shows the upsetting of the sides after the side stakes have been inserted. The weave shown is called pairing. It is stronger than single weaving



FIG. 3.—The finished basket. It would make a good waste-paper basket. A work-basket could be made in the same way, with a wider base and shorter sides.



FIG. 4.—The canes are being split to start a strong base. The split must be exactly in the middle of the cane, and just long enough to take the other four canes.

CANE BASKET WEAVING (2)



Fig 5 shows how the weaver is started in pairing. The loop must be not quite in the middle of the weaver, so that when the new weavers are joined on they come at different places.



Fig 6.—Here the method of slyping cane is shown. Make a gradual cut, leaving half the thickness of the cane at the end. Cane is slyped before being inserted for stakes or handles.

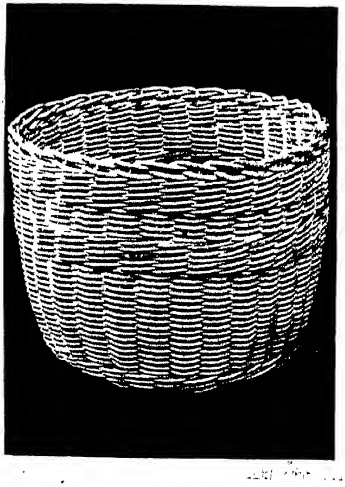


Fig. 7.—The upsetting of the side of this basket is done in three-rod waling. There is a strengthening band of this before the border is reached. The rest is done in randing.



Fig. 8.—Note how the handle is inserted and bound down with the split cane. The piece that made the cross is bound in all the way across, so that the handle cannot be pulled out.

it, then four rows of randing, before the final five rows of three-rod waling which make a firm foundation for the border.

The border is worked, after the canes have been soaked for half an hour, by bending any cane in front of the one to the right, behind the second, in front of the third, and behind the fourth, where it is left. The first two or three stakes to be bent for the border must not be pressed too close to the side, as the last stakes have to be woven under them. All the rest must be pressed down as closely as possible.

To Insert a Handle.

A basket which is to be given a handle should have an even number of side stakes. Cut one very thick cane (or two thinner ones) to the length of the handle, plus twice the measurement of the side of the basket. Thus, if a 17-inch handle is wanted on a basket having sides 5 inches in depth, a cane 27 inches long must be cut (in Fig. 8 two lengths of No. 12 are used).

The two ends must be slyped and pushed down beside two side-stakes on opposite sides of the basket, until they reach the base.

Call the two points where the handle enters the sides A and B respectively.

Take a piece of well-soaked split cane. Insert one end of it (at A) from the front, under the waling, and to the right of the handle-stake. Leave 10 inches on the inside. Take the other end of the split cane, carry it across the waling and the handle-stake and insert it under the border. Bring it to the front again under the waling, but still on the left of the handle. Cross to the other side of the handle and insert it under the border on the right side.

Now carry this long piece over the handle to B and bind the handle down on that side in the same way. When this is done, continue with the same cane (which must be sufficiently long to reach the other side) and wrap it firmly round the handle and the piece of split cane until A is reached (Fig. 8).

Push the end of the wrapping cane well down the side of the basket and fasten it down with the first end, which must then be pushed down the side also, behind the handle.

SEWING

Blanket stitch and Daisy stitch can now be learned.

A pram or cot cover would be a good article to make. Tea cosies or hot-water bottle covers would also be suitable.

Materials :—

A piece of soft Woollen Material 36 inches by 20 inches.
Coloured Wools.
Crewel Needles.

Method.

Turn a single ½-inch hem all round to the wrong side and tack.

Choose a thick wool in a colour to harmonise with that of the material. Hide the starting knot under the hem and work all round in blanket stitch. This is done by holding the thread down with the left hand and lifting a stitch, with the needle pointing downwards. Put the needle through (Fig. 9). Work the corner as shown.

Ornament the cover with daisy stitch (see Embroidery Stitches), using one colour for the flowers and green for the leaves, making a suitable design.

KNITTING

The easiest way to learn to knit is to study the pictures, which show each step as it is done.

Some things which it is useful to know cannot be shown in pictures, but they are very important and, as knitting is one of the most useful crafts known, they should be carefully noted from the start.

Keep the work clean when not being done by wrapping it in a cloth, as wool catches dust very easily.

Always join wool by darning one end into another for about 2 inches.

When knitting a plain row, slip the first stitch purlwise.

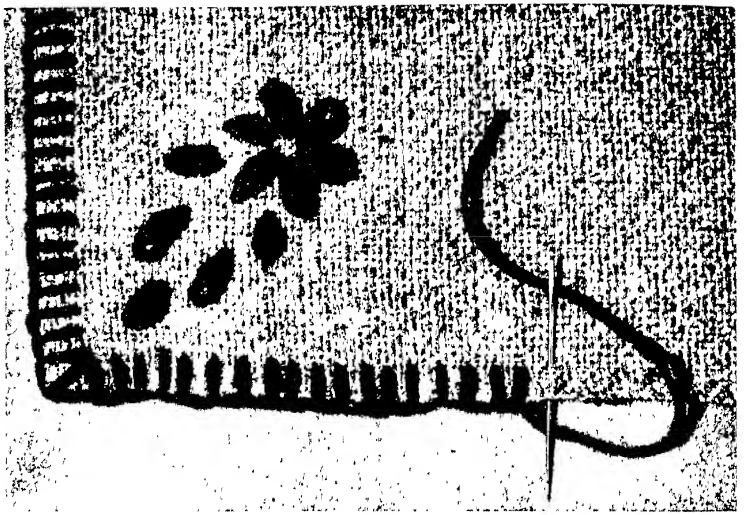


FIG. 9

Blanket stitch in thick wool is worked all round the pram cover shown above. The decoration is in daisy stitch. When plain blanket stitch has been learned, it is interesting to work alternate long and short stitches, but many different arrangements may be made.

When knitting a purl row, slip the first stitch plainwise. These make neat edges.

If the knitting seems too loose, use smaller pins. This will produce more even knitting.

If the casting off is too loose, use a smaller pin than that used for the rest of the work.

A cover for a doll's bed is suggested as a start. With 5-ply wool and No. 6 pins cast on fifty stitches. Work as long as desired in garter stitch and cast off.

Fig. 1, To Cast On.

Hold the wool between the second and third fingers of the left hand, leaving 2 yards of wool at the back of the hand for every 100 stitches to be cast on. Twist the wool round the left thumb. Put the needle into this and knit it with the long end of wool attached to the ball, as if it were a stitch. Make another loop with the other end of wool and knit it in the same way. Cast on as many stitches as desired. This makes a very firm edge which will not stretch.

Fig. 2, Garter Stitch.

In this stitch every row is a plain row, and is knitted by putting the needle into the stitch from the left side of the stitch, bringing the wool from the back and putting it between the needles, pulling the wool through with the right-hand needle and then slipping the stitch off the left-hand needle. There are four movements in each stitch, in, over, out and off.

Fig. 3, Stocking Stitch.

(Alternate rows of plain and purl.)

The right side of stocking stitch is knitted in the same way as garter stitch.

KNITTING (1)

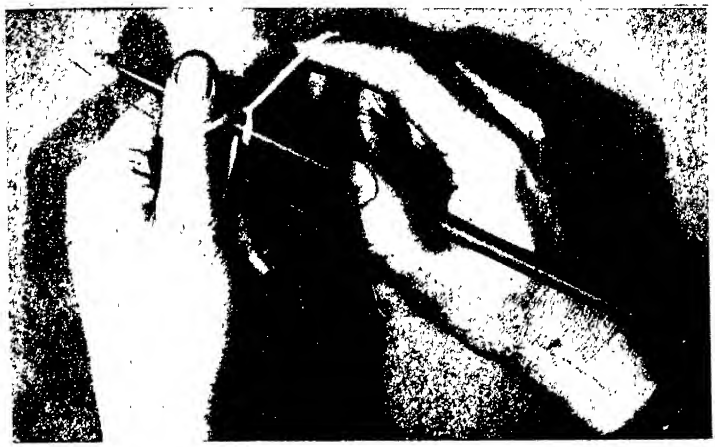


FIG 1 shows how to cast on stitches for knitting. There are several different methods for this, but the one illustrated above is most generally useful, as it gives a good firm edge. Care must be taken to leave sufficient wool in the left hand to cast on the required number of stitches. The casting on of stitches for garments must not be too tight, or the strain will break the wool.

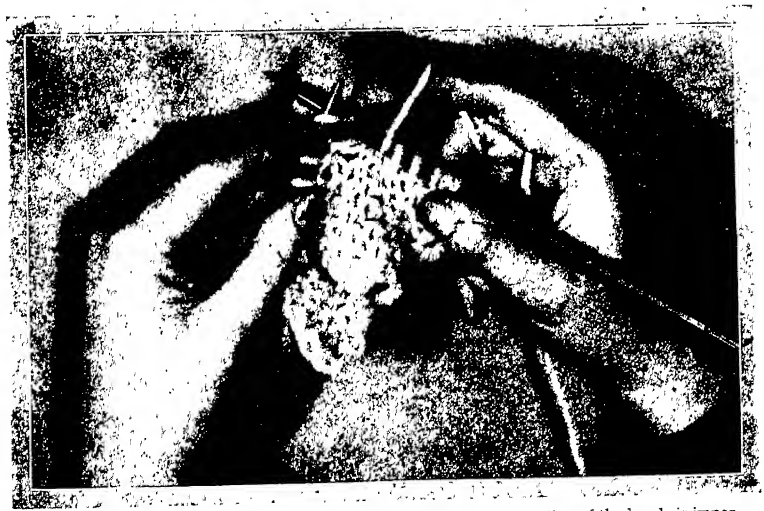


FIG. 2.—Here the method of working garter stitch is seen. The position of the hands is important. It will be noted that the wool is twisted round the middle finger of the right hand. This regulates the tension and keeps the work from becoming too loose. This is a useful stitch for pram or cot covers, babies' clothes, jumpers and many other things. Both sides are alike.



FIG. 3.—This shows the plain side of stocking stitch. This stitch is used for articles that are to be seen only on one side. For jumpers, dresses, hot-water bottle covers, caps, etc., it is useful. It gives a lighter web and stretches more easily than garter stitch and it takes less wool to work than the other. The finished surface is smooth instead of ribbed.

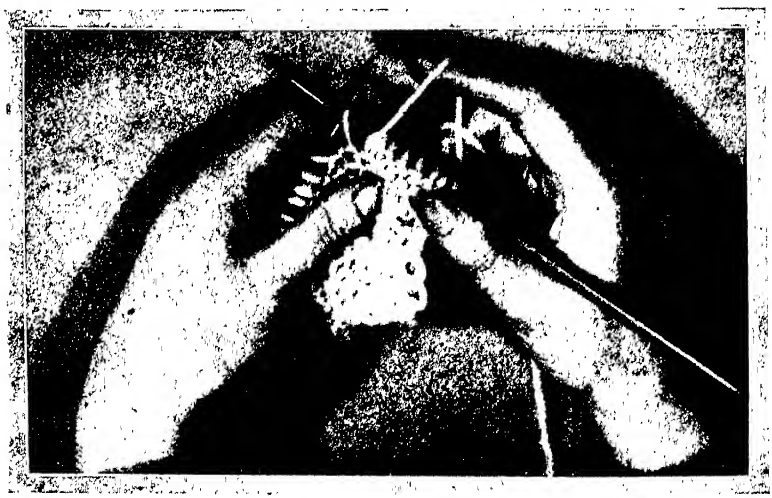


FIG. 4.—When stocking stitch is done on two needles only the reverse side must be purled. As will be seen above, the needle is put into the front of the stitch from the right and the wool brought forward over it. In making socks and stockings the work is done on four needles continuously, so that it is all done from the front, and there is no purl row. The wrong side looks like garter stitch.



FIG. 5.—Ribbing is used when an elastic web is required. It is done by working a certain number of stitches plain and a certain number purl. On the other side the order of purl and plain is reversed.

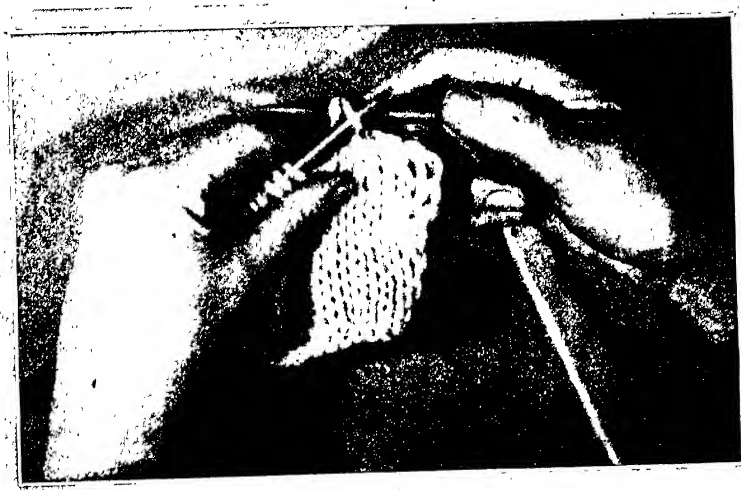


FIG. 6.—Here the work is being cast off. Two stitches are knitted, and the first lifted over the second and slipped off the needle. Care must be taken not to make the casting off too tight.

Fig. 4.

This shows the wrong side of stocking stitch. Put the needle into the right of the stitch from the back, put the wool between the needles, pull it through and slip the stitch off.

Fig. 5, Ribbing.

This is done by knitting so many stitches plain and so many purl. Any number may be used, but the smaller the rib the tighter the web. Two and two is useful. Knit two stitches plain, bring the wool forward from the back to the front, purl two stitches, take the wool through from the front to the back. Repeat to the end of the row. In knitting a two and two rib the number of stitches must be divisible by four. In knitting three and three rib the number must be divisible by six, and so on.

Fig. 6, Casting Off.

Knit two stitches. Insert the left-hand needle at the left-hand side of the first knitted stitch and slip it over the second knitted stitch and off the needle. Knit another stitch. Lift the second knitted stitch over the third and so on to the end of the row. When only one stitch is left, break off about 4 inches of wool, draw it through the last stitch and pull it up, then darn the end up the side of the knitting where it will not show.

CROCHET

Crochet also can best be learned from pictures. Use a bone crochet hook for wool or thick silk and a steel one for cotton or thin silk.

Fig. 6 shows a scarf that could be made by a beginner.

With a No. 8 bone crochet hook make a chain, with 5-ply wool, 1 yard long. Work a row of double crochet all round on both sides of this, back to the starting point.

Now work a row of treble crochet all round the double crochet, working only into the backs of the loops.

Continue this, using two or more colours and either double or treble crochet, until the scarf is the desired width, then break off 4 inches of wool, pull it through the last loop and darn it in.

Shawls, tea-cosies, chair-backs, caps and many other things can be made in crochet.

Fig. 1.

Chain, which is the beginning of all crochet. Make a loop in the end of the wool. Pull the wool through this loop. Continue to pull the wool through each loop until the chain is sufficiently long.

Fig. 2.

Single Crochet consists in putting the hook into a stitch in the chain or into the back loop of another stitch, putting the wool over the hook and pulling it through both loops at once. (Pull through once.)



FIG. 1

This shows the method of making chain, which is the beginning of all crochet. Chain may also be used as a draw-string for knitted or crochet garments.



FIG. 2.—In single crochet, which is shown above, the wool is pulled through the loop only once, as the name implies. This stitch is used to neaten edges, as the work is very firm and close.



FIG. 3.—Double crochet, in which the wool is pulled twice through the loop, gives a very firm unyielding fabric. For yokes and cuffs of dresses and jumpers it is most suitable. It also may be used to neaten edges.



FIG. 4.—In treble crochet the wool is pulled three times through the loop. This gives a long, cord-like stitch. In wool it makes a light and fleecy texture, but it is mostly used in making fancy borders for trimming household linens, in cotton.



FIG. 5.—In double treble crochet the wool is pulled four times through the loop. This gives an even lacier texture than treble crochet, in wool. The stitch is useful in making slots through which ribbon is to be threaded.

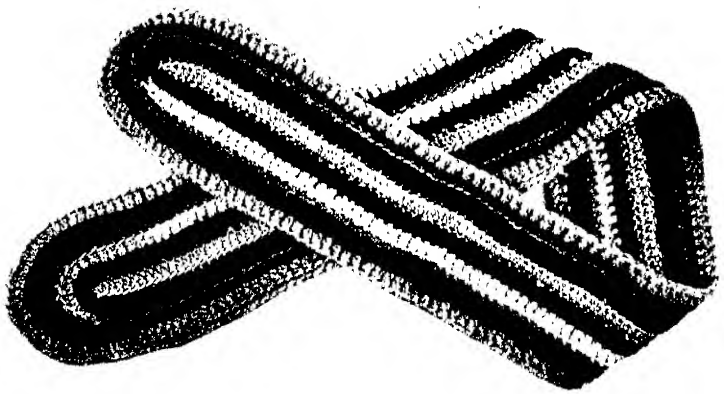


FIG. 6

The scarf above could be made by quite a small child. Very many useful things may be made in crochet in wool, and it is a craft which children much enjoy. They must be allowed free choice of wools, and must also be permitted to determine the shape of the article themselves, as otherwise this craft gives little scope for the creative instinct.

Fig. 3.

Double Crochet starts in the same way as single crochet, but instead of the wool being pulled through two loops it is pulled through one, then the wool is put over the hook again and pulled through the remaining loops. (Pull through twice.)

Fig. 4.

Treble Crochet. In this stitch the wool is put over before the hook is inserted. It is then pulled through one loop, the wool put over again and pulled through two loops, the wool put over a third time and pulled through the last two loops. (Pull through three times.)

Fig. 5.

Double Treble Crochet. In working this the wool is put over the hook twice. The hook is then inserted and pulled through one loop, the wool is put over and pulled through two loops, the wool is put over a third time and pulled through two loops and then it is put over a fourth time and pulled through the remaining two loops. (Pull through four times.)

POTTERY

Nowadays potters shape the clay on a potter's wheel. Long ago, before people lived in houses, they had nothing of that sort to use and had to make their pots by hand. The method they used was very much the same as that employed by the North American Indians to make baskets, and the only tools they had were their own hands and pieces of stone, stick or bone.

Take some clay just damp enough to be workable. Throw it down very hard on a table, pick it up and throw it down again. Do this a great many times. It is to drive all the air bubbles out of the clay and to distribute the moisture

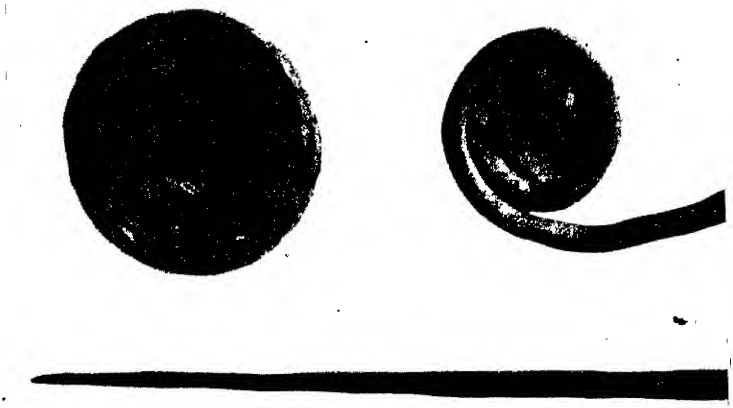


FIG. 1.—At the bottom of this illustration can be seen the beginning of the coil, with its tapering end. On the right the coil has been smoothed out in the centre. Each round must be smoothed as completed. On the left the completed base is seen, smoothed on both sides, trimmed to an exact round and ready for the first coil forming the side to be added.



Fig. 2 shows the raising of the sides on the base. Note that each coil is joined at a different point. The position of the hands whilst smoothing the sides is very important. The thumb of the one hand should always be inside the pot to keep the clay from being pressed out of shape, while the forefinger of the other hand smooths the outside, and *vice versâ*.

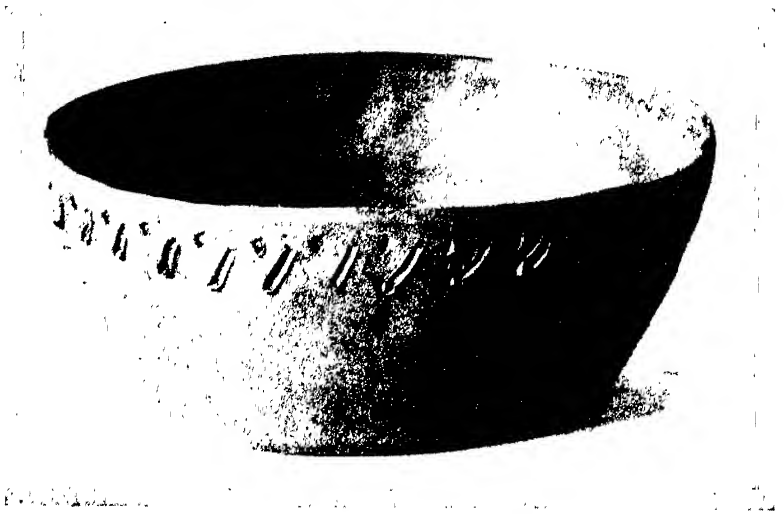


FIG. 3

This shows a pot made entirely by hand in coiled pottery, with the decoration put on with a piece of stick. The smoothing of the sides must be done with a very gentle movement, so that the pressure does not make the clay thinner in some parts than in others.

evenly. Cut it through with a wire and see that the clay is tightly packed together and stick the two pieces together again. Cover with a damp cloth. Repeat this every day for two or three days. It is called wedging the clay.

The clay should now be in a fit condition for use. Make a long roll of clay, slightly thicker than the pot is to be, by rolling the clay with the hand on a table or board. The end should taper to a point. When a long roll with no breaks has been made, start coiling it round as in the coiled basket work, pressing the coils close together and smoothing out the grooves with the thumb (Fig. 1).

When the base is large enough and quite flat, turn it over and smooth the other side. See that it is quite round. Lay the next coil on top of the edge instead of alongside and break off the coil when the round is completed. Start each coil in a different place, so that the joins do not come above each other (Fig. 2). The pot must now be smoothed outside and inside as the work is done. Continue until the pot is the right size.

A pattern can be made with a small piece of stick on the outside, taking great care not to press heavily or the pot will be thrown out of shape (Fig. 3).

The pot must be left alone for several days to dry.

The old way of firing pottery was to make a wood fire, then to rake it out, put the pot in the middle, and cover it with the hot ashes, leaving it there until it was cold. This can be tried, or the pot can be fired in a kiln in a pottery.

The use of the wedging will now be seen, for, if any water or air was left in it, the clay would sink in the firing at that place and the pot would be warped.

If the pot is to hold water it must be glazed and fired again. This second firing must be done at a pottery, as the heat to fire glaze must be much greater than any that can be maintained elsewhere.

Visits to museums, where primitive pottery may be studied, will yield ideas for shapes and decoration.

SEWING

Some of the plain needlework stitches should now be learned. Using these (see Plain Needlework section) and tacking or other embroidery stitches make the apron illustrated in Fig. 4, p. 370.

Materials :—

1 yard Linen or Casement Cloth of a neutral shade.
Sewing Cotton.
Thick Embroidery Cottons in several colours.
Sewing Needles and Embroidery Needles.
Ruler.
Thimble.
One Button.

Method.

Cut a 5-inch strip across the width of the material.

Taking the large piece of material, turn a ½-inch hem down each side, then fold over again, making a hem 1 inch wide. Tack both sides with sewing cotton.

Turn up ½ inch along the bottom and fold over again to make a hem 4 inches wide. Tack with sewing cotton. All these hems are to be turned to the right side.

Choose which colours of embroidery cotton are to be used and work a simple border on both hems, on the right side of the material.

Measure 4 inches up from the bottom hem. A crease may be made as a guide for the first row of tacking stitches, but no other guides may be used in working this border as the eye must be trained to judge the spacing without a guide.

Any tacking or embroidery stitches may be used in this border. Chain stitch is very effective used with tacking stitch. Blanket stitch, couching and herring-bone stitch also are good. Several colours may be used.. The design must balance, *i.e.*, the top and bottom lines should be the same. The lines inside those should correspond, and so on into the middle line (see Fig. 5).

Study embroideries in museums done by Russian, Rumanian, Czecho-Slovakian and other peasants. Their colour groupings are always good and many ideas may be obtained.

The top of the apron may be pleated as in the illustration, or it may be gathered and set into the band (instructions for setting gathers into a band are given in Plain Needlework).

The ends of the band which come beyond the apron on both sides should be over-sewn in colour and finished with a button and a loop to fasten.

PLAIN NEEDLEWORK

There are certain seams and stitches that are used on all garments and household linens. These are described and illustrated here. It is important that the correct way of doing each stitch and seam should be learned at the beginning, and these few general directions carefully noted.

The working materials ought to be chosen with care so that the results may be good.

Use as fine a needle as is suitable for the material. Its point should be very sharp (except when a tapestry needle is used) and its eye just large enough to take the cotton or silk. A blunt point or a large eye would pucker the material.

For plain needlework use as fine a cotton or silk as is suitable for the material.

Knots should never be used, except to start tacking or gathering. All other seams should be begun by taking several small stitches backwards. These will be covered by the seam. In hemming they should be hidden under the hem. This applies also in joining thread.

Take only a short length of cotton or silk in the needle. A large one twists and becomes knotted.

Use a thimble with no jagged places to catch threads.

AN EMBROIDERED APRON

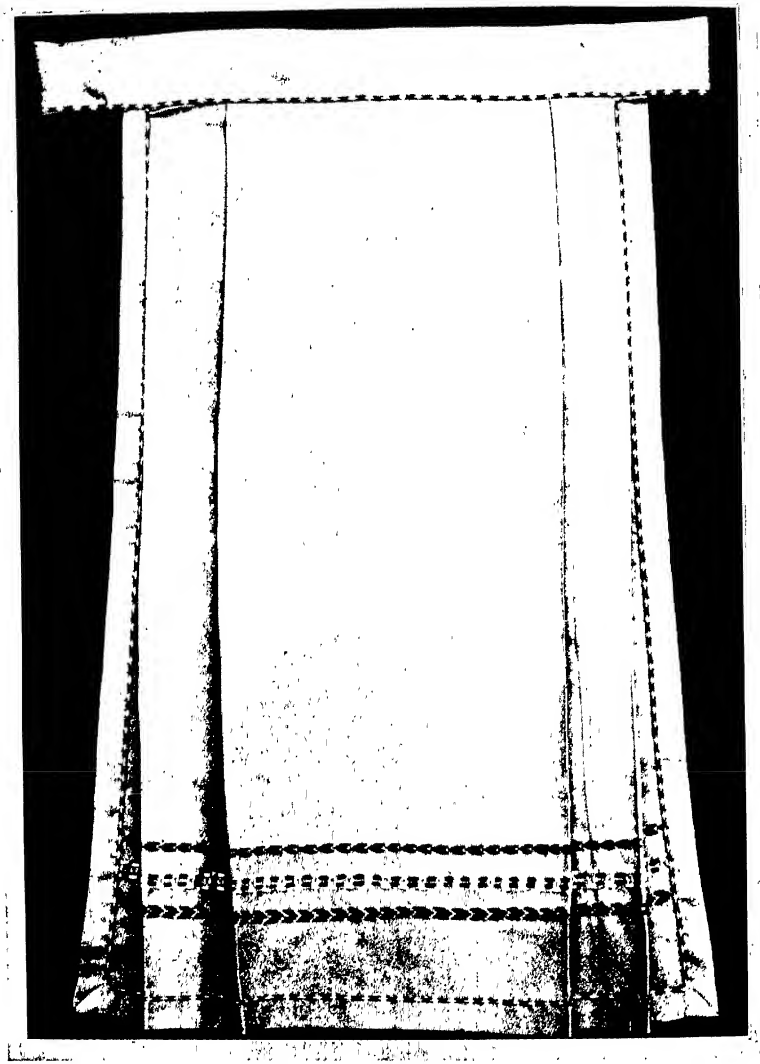


FIG. 4.—Now that the child has gained more control over the muscles, a smaller needle may be used, and finer sewing learned. The first article should be simple. An apron is a good choice, as the seams are short and the decoration keeps the work from becoming monotonous. Choice of materials should be left entirely to the child. If the choice later be found to be unsuitable more will be learned from the mistake than from advice.

Sit with the light coming over the left shoulder. Keep the back straight and hold the seam as near the eyes as is necessary. Never bend the head down to the seam.

The stitches and the spacing are large in the illustrations, so that the method of working may easily be seen.

Tacking (Fig. 1).

This is used to keep two pieces of material in place while they are being sewn together. Take small stitches through, with a long stitch between, near, but not over the place to be sewn. It is best to tack with cotton or silk of a different colour from the material as it shows up better and can be more easily removed. The tacking should be even, as it acts as a guide for the sewing.

Hemming (Fig. 2).

This is the most usual way of finishing an edge. The hem must be even and should be tacked down before the sewing is begun. The needle is inserted in a slanting direction up and under the hem. It comes out just above the edge of the hem and is inserted again a little in front of the place where it came out. The thread must not be pulled tightly or it will pucker the material.

Stitching (Fig. 3).

Stitching is the firmest method of joining two pieces of material. It consists in taking small stitches in a straight line, inserting the needle for each stitch at the point where it came out in the previous stitch. A thread of the material may be drawn out as a guide, to keep the work straight.

Over-sewing (Fig. 4).

This method is most often used when two selvedges have to be sewn together. Tack them firmly in place. Take small stitches through both pieces of material, inserting the needle at the back and bringing it out straight through to the front. Insert it again for the next

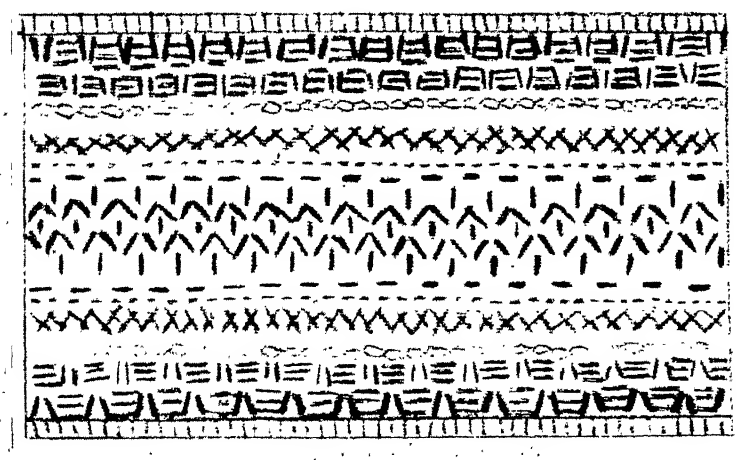


FIG. 5

The border above is worked largely in tacking stitch, used horizontally, vertically and diagonally, but there are two lines of herring bone, two of chain stitch and four of outline stitch. Care and judgment must be exercised in the placing of the colours. Those that differ most from the background should form the smaller stitches.

PLAIN NEEDLEWORK (1)

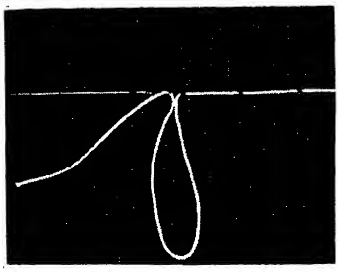


FIG. 1 shows how to tack two pieces of material together. Only a small stitch must be taken through, or the two pieces will pull apart.

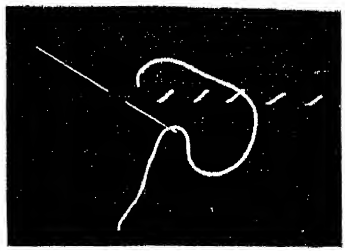


FIG. 2.—In hemming, the direction of the needle is all-important. It must slant, as in the picture, and be inserted again in front of where it came out.

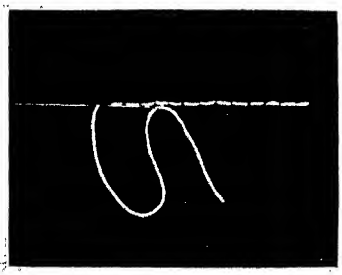


FIG. 3.—In stitching the needle is put in where the thread from the previous stitch came out. It is important to make all the stitches the same length.

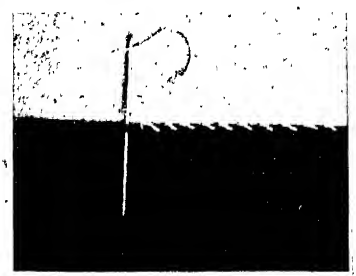


FIG. 4.—The direction of the needle is important in over-sewing. It should point straight towards the body as it comes through. Note how the stitches slant.

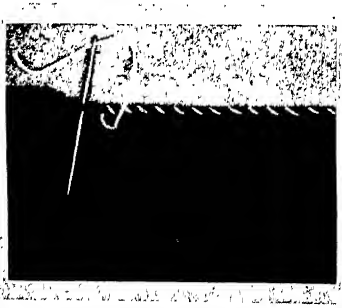


FIG. 5.—Whipping is the same stitch as over-sewing, but it is done over only one thickness of material, the edge of which is rolled over by the left thumb.

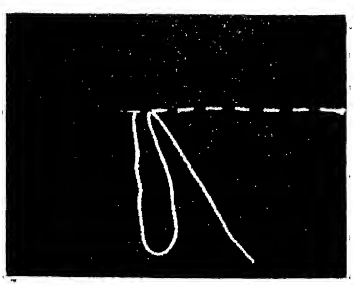


FIG. 6.—A knot is used to begin a gathering thread. The stitches must be of equal length, and of the same length as the space between.

PLAIN NEEDLEWORK (2)



FIG 7 shows the gathers pulled up for stroking. The eye end of the needle should be used for this, for fear of tearing the material.

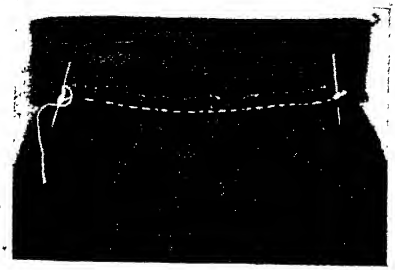


FIG. 8.—Here the stroked gathers are ready to be set into the band They must be tacked into position and then stitched down to the band on the wrong side, one stitch being taken over each pleat.



FIG 9 shows the first part of a run-and-fell seam. The work must next be opened up flat and a small hem turned down on the back piece of material and tacked in position.

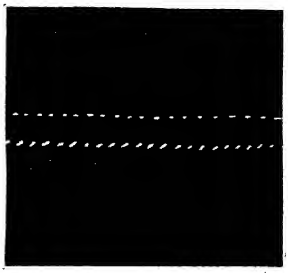


FIG. 10.—Here the hem has been sewn down and the finished seam is seen. It makes a flat join, and is useful in making underclothing.

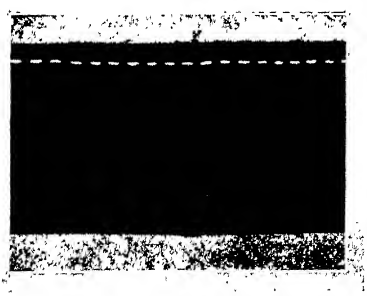


FIG. 11 shows the first part of a French seam. This is done on the right side of the material. The raw edges are then trimmed as close to the seam as possible.

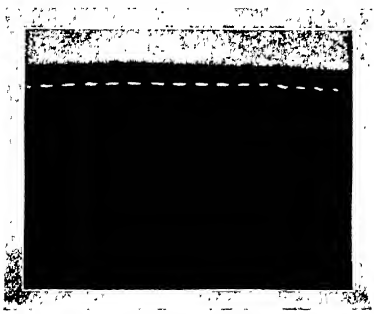


FIG. 12.—In this the finished French seam is seen. This second part is done on the wrong side of the material. The seam is used on dresses, blouses and children's clothes.

stitch a little in front of the place where it came out in the previous stitch.

Whipping (Fig. 5).

The stitch in this case is the same as in over-sewing. It is used to finish an edge where a hem is not desired, and sometimes lace is sewn on at the same time. Roll a small portion of the raw edge of the material towards the body between the moistened finger and thumb of the left hand. Sew this down as in over-sewing, then roll the next part. Never roll more than 1 inch at a time, as it comes unrolled and is apt to fray with too much handling. If lace is to be joined by this method it should have its straight edge laid at the back of the material and the stitch taken through both lace and material.

Gathering (Figs. 6, 7, and 8).

This must be started with a knot which should be fairly large and should be on the right side of the material. Small even stitches are picked up, keeping the line parallel with the edge of the material (Fig. 6). When the end is reached, take off the needle and make a knot at the end of the thread. Put in a pin at right angles to the line of gathering thread, just beyond the last stitch, which should be ½ inch from the end of the material. Pull the gathering thread up tightly and wind the cotton round the pin, first round the head then round the point (Fig. 7).

To Stroke the Gathers. Hold the material with the gathered part over the first finger of the left hand. Take the needle in the other hand and pull it gently down between each fold of the material, using the eye end so as not to tear the material.

To Set the Gathers. When the gathers have all been stroked into position, take out the pin, attach the right-hand end to the band, ½ inch from the head of the band with a pin, attach the other end in the same way to the other end of the band, regulate the fullness and again wind the cotton round the pin. Tack the seam in position.

The gathering must now be stitched to the band, which is placed behind the gathers with the two right sides together and the raw edges at the top. Take one stitch through each fold.

Turn the ½-inch ends of the band to the inside, turning also a ½-inch hem on the wrong side of the band itself (Fig. 8). Tack this down over the gathering thread. Over-sew the ends, and hem the rest of the band, taking one stitch between each gather.

Run and Fell Seam (Figs. 9 and 10).

Tack two pieces of material so that the front piece is ½ inch lower than the back one (Fig. 9). The right side of the material is inside. Run all along the edge of this lower piece (running is the same stitch as gathering, but is not pulled up). When this is done, trim the lower piece as narrow as possible, open up the seam, and run a finger or thimble along the seam on the right side. Now fold over a very narrow hem on the back piece of material. Tack it and hem it down neatly. This is called felling (Fig. 10). It makes a neat flat seam.

French Seam (Figs. 11 and 12).

Put the pieces of material to be joined with their edges meeting. Tack them firmly. If a thick material is to be sewn this should be stitched a ¼ inch from the edge. If the material is thin a fine running stitch is better. This first seam should be done on the right side of the material (Fig. 11).

Now turn the garment inside out and make another seam, similar to the first, on the wrong side of the material (Fig. 12).

For flannel the first seam is stitched as for the first seam described above. Then the two raw edges are opened out and each is herring-boned down to the material (see Herring-bone).

Sewing on Buttons (Figs. 13 and 14).

Linen buttons may be sewn on in either of two ways. First by making a

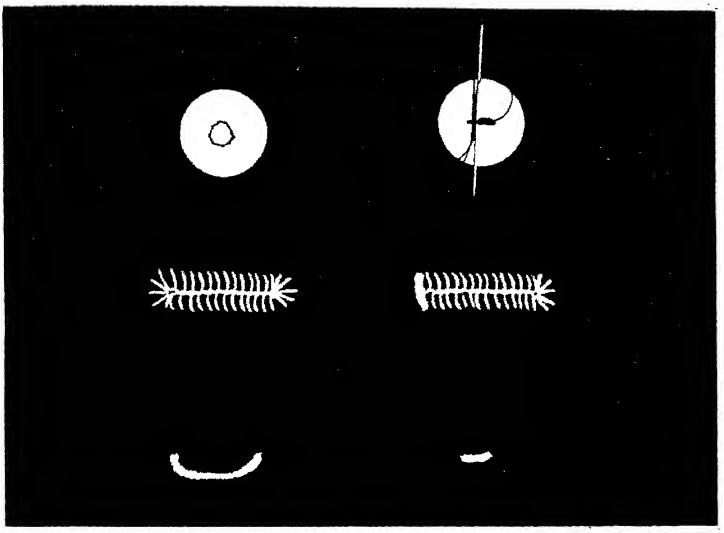


FIG. 13.—Linen button attached with a ring of stitching.

Fig. 15 shows how to make an ordinary buttonhole.

FIG. 17.—Large buttonholed loop, to take a button.

FIG. 14.—Linen button attached with a buttonholed loop.

FIG. 16.—A buttonhole that will stand a strain.

FIG. 18.—Small buttonholed loop to take a hook.

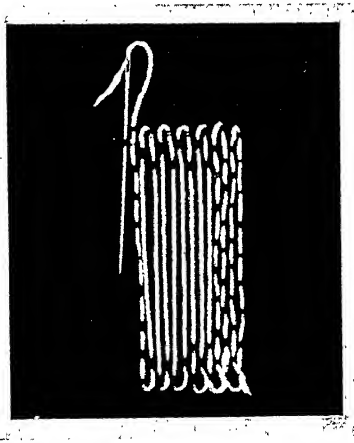


FIG. 19.—This shows how the right side of a darn should look before the cross-threads are darned in. Note the loops which allow for shrinkage.

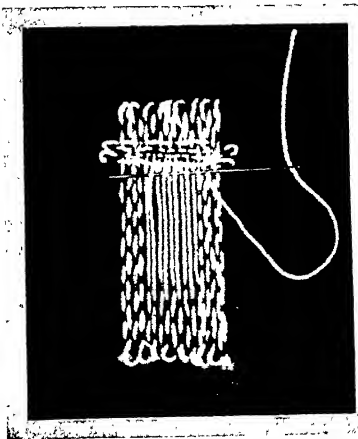


Fig. 20 shows the method of filling in the hole in darning. Thick wools or cottons should never be used for this work, as they tear the material in working.

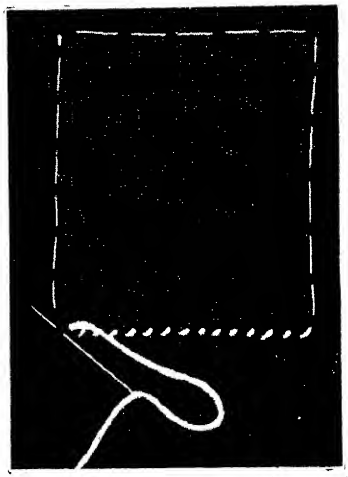


FIG. 21

A patch applied over the worn part. This must be tacked firmly in position and hemmed down with small stitches.

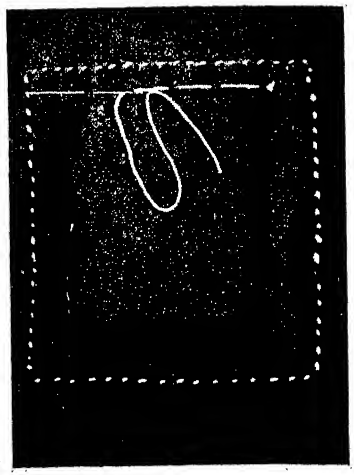


FIG. 22

Here is shown the worn part of the material cut away. The part that is left must be mitred, tacked and hemmed down.

ring of stitching as in Fig. 13, or by taking three or four long stitches across the top and covering these with buttonhole stitch as in Fig. 14, using the eye of the needle.

Buttonholes (Figs. 15 and 16).

Button stitch is the same as blanket stitch with stitches close together. Buttonholes must be cut on the straight and should always lie across, not up and down a garment. They must be worked as soon as they are cut or the edges will fray.

Starting half-way along one side, work in buttonhole stitch, with the stitches as close together as possible until the end is reached. Five oversewing stitches should be taken at the end, the second side worked, five oversewing stitches taken at the other end and the first side completed (Fig. 15). The thread must be fastened off neatly at the back by running it under the backs of the stitches.

On a buttonhole where there is a great strain the end where the strain comes should be done as in Fig. 16. Instead of over-sewing this end several long stitches should be taken across and then these should be neatly covered with buttonholing.

Loops (Figs. 17 and 18).

Where material is too thick to make a buttonhole a loop is often used. A pencil should be laid on the material and two or three stitches taken over this. Take the pencil out and test whether the stitches are the right length by passing the button through them. The button should go through easily, as the loop tightens when it is being covered. Cover these stitches with buttonhole stitch, being careful to see before starting that enough thread is in the needle to finish the work, as it is not possible to join it in the middle (Fig. 17).

A smaller loop for a hook is made without the pencil (Fig. 18).

Darning (Figs. 19 and 20).

Use fine wool or silk for darning, and work with the smallest-eyed needle that will take the thread. Use silk on silk and wool on wool. Work on the right side of the material.

Run two or three rows of darning stitch up and down the material by the side of the hole, leaving a small loop at the turning. Darning always shrinks in washing, and if these loops are left the darn will not pucker when it shrinks. When the hole is reached the thread to cover it must be on the right side of the material, and the needle should be inserted on the right side of the material on the other side of the hole (Fig. 19). Pick up two or three stitches on each side of the hole at top and bottom as well as at the sides. When the first threads are laid, cut off the wool or silk, and start darning from side to side, filling in the hole by going alternately over and under the laid threads as well as over and under the stitches at the sides of the hole. The thread is not fastened either at the beginning or end of the work (Fig. 20).

Patching (Figs. 21 and 22).

Take a piece of material to match the piece to be patched. Cut a square that will cover the hole and leave 1 inch to spare at all four sides. If the material is patterned, match the patterns on the patch. Turn in a ½-inch hem all round this square, tack it firmly and hem down on the right side (Fig. 21).

Turn over to the wrong side, cut away the worn material, slit up the corners to a depth of ½ inch, turn in a hem and sew it down (Fig. 22).

EMBROIDERY STITCHES

Blanket Stitch (see p. 359).

Chain Stitch (Fig. 1).

Hold the thread down with the left thumb. Take a stitch downwards from the place where the thread started. Pull the needle through. Take the next stitch from inside the previous one. This is suitable only for thick strands of silk, wool or cotton.

Couching (Fig. 2).

Place one or more thick threads in position and sew them down with one strand of a thinner thread, taking regularly spaced stitches. This looks best when the couching thread is in another colour from the threads which are to be sewn down.

Cross Stitch (see p. 354).

Daisy Stitch (Figs. 3 and 4).

Hold the thread down with the left thumb and take a stitch like a chain stitch (Fig. 3). Now insert the needle under the loop and bring it out near the beginning of the previous stitch (Fig. 4). Use thick strands of silk, wool or cotton for this stitch.

Darning (Fig. 5).

This is used in embroidery to fill up backgrounds. It may be worked in silk, wool or cotton. Lift a very small stitch and keep the work regular.

Feathering (Fig. 6).

Hold the thread down with the left thumb. Pick up a slanting stitch to the left of the thread, with the needle pointing towards the body, pull the needle through. Hold the thread down and take the next stitch to the right of it, slanting towards the middle. This is generally worked in cotton thread, but can be done in silk.

Fly Stitch (Fig. 7).

Take a stitch as for feathering, but insert the needle in a line with the starting place of the thread. Catch the thread down with a small stitch as in daisy stitch, taking the needle back to the right of the stitch just completed. This is suitable for thick threads only.

French Knots (Fig. 8).

Work this with double thread. Take

EMBROIDERY STITCHES (1)

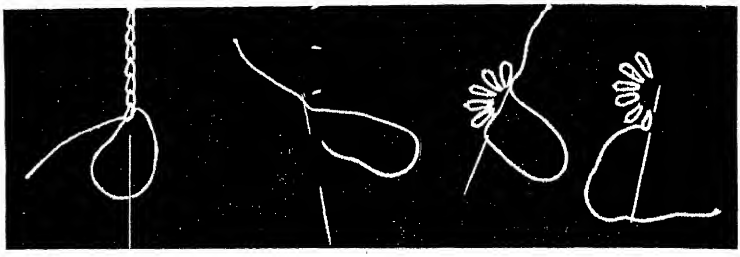


FIG. 1.—*Chain Stitch.* — The needle goes back each time into the last loop.

FIG. 2.—*Couching.*—One or more thick strands sewn down with a thinner strand.

FIG. 3. — *Daisy Stitch.*—The first part resembles one chain stitch.

FIG. 4. — The needle taken back to the centre for the next petal.

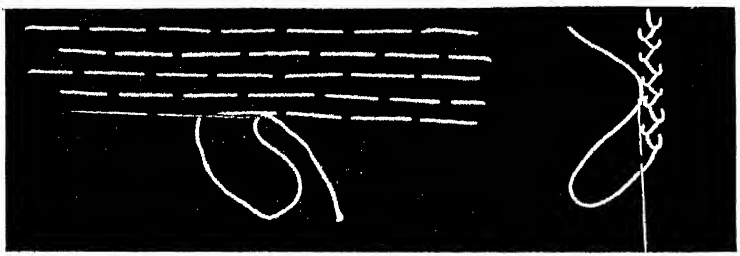


FIG. 5.—*Embroidery Darning.*—This consists of rows of tacking stitch, in which the stitches of one row alternate with the spaces in the previous row. It is used to fill in backgrounds.

FIG. 6.—*Feathering.*—Notice the slant of the needle. It must be inserted each time below the end of the previous stitch.



FIG. 7.—*Fly Stitch* is like daisy stitch with the top end open, and the stitches in a row instead of a circle. Two creases may be made in the material to keep the edges parallel.

FIG. 8.—*French Knots.*—These are often used to fasten down a hem. They are also used as centres for flowers, for small flowers, such as forget-me-nots, or to form a fruit.

EMBROIDERY STITCHES (2)

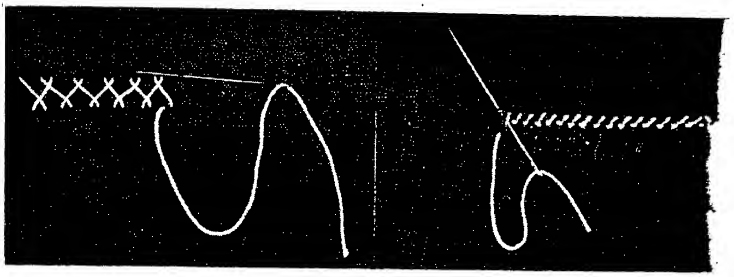


FIG. 9.—*Herring-boning*.—This is a useful stitch in embroidery. It may be worked solid in colour on the wrong side of transparent white material to form a design.

FIG. 10.—*Hem-stitching*.—This is very effective if the other edge of the drawn threads is also worked, keeping the threads in the same bunches (see p. 380)



FIG. 11.—*Satin Stitch*.—This is a useful stitch for solid embroidery in either natural or conventional design. Padding underneath improves it.

FIG. 12.—*Stem Stitch*.—This is sometimes called outline stitch. It is used for outline embroidery, and also for stems and veins.

FIG. 13.—*Stroke Stitch* is very effective worked in thick wools or raffia on canvas. It is especially good for geometrical designs.

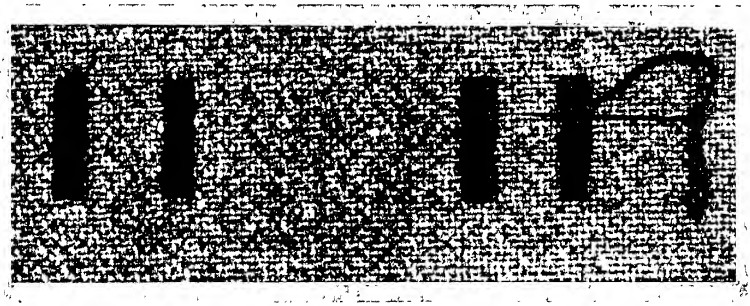


FIG. 14.—*Weaving Stitch*.—Laid threads are seen above. Instead of laying these, threads may be pulled out of any coarse-meshed material as for hem-stitching

FIG. 15 shows the method of weaving the threads shown in Fig. 14. The weaving may be done over any number of groups. There are only two groups in the illustration.

a very small stitch with the needle, twist the double thread once round the needle, and, holding the twist with the thumb, pull needle through and insert it under the knot. This looks best in silk and cotton threads.

Herring-bone (Fig. 9).

This is worked from left to right on two parallel lines. Bring the needle to the front on the top line, then, keeping the needle under the thread, take a small stitch on the lower line, then one on the top line. This stitch is generally used on flannel where a double folded hem is not desired. It should be worked in sewing silk. If a closed herring-bone stitch is worked, with no space between the stitches, a neat double row of stitches will result on the right side. It can also be used for decorative purposes in cotton or wool.

Hem-stitching (Fig. 10).

Below the hem pull out as many threads as desired. The number will vary according to the material used, more being pulled out in finely woven and fewer in a thick material.

Tack the hem down. Pass the needle under three, four or five threads, pull it through, then, bringing it back to the space it started from, take a hemming-stitch through the hem, bringing the needle out above the little cluster of threads thus pulled together. Silk thread should be used on a silk material and linen on linen.

Satin-stitch (Fig. 11).

This stitch is used to cover a space, the needle being inserted close to the previous stitch. It can be worked either from right to left or left to right. It is best worked in silk or cotton.

Stem Stitch (Fig. 12).

This should be worked in firm and fairly fine thread, as it is used for definite lines. Pick up a small stitch, always keeping the needle on the left of the thread and on the left of the previous stitch.

Stroke Stitch (Fig. 13).

This consists of single stitches taken in any direction the pattern may require. It is best worked in thick threads.

Weaving Stitch (Figs. 14 and 15).

Strands of thread may be worked for a foundation, as in Fig. 14, or threads may be drawn from the material. Divide the strands into equal numbers and darn them as in Fig. 15, using a tapestry needle.

Borders can be worked in this way in blocks of alternate colours, with drawn threads as a foundation, or darned strands may be used as slots for cord in drawing up bags. Thick silk, cotton or wool should be used for working.

Now that we have heard about all these different materials and what we can do with them, let us consider, what is rarely thought of, but much more important, the effect that the work has on the worker.

A piece of work may be well executed and beautiful, but unless it is the unaided expression of the worker (in choice of suitable material, choice of design and the method and means of working it out, as well as the work itself) it is of little value, as it has done nothing to strengthen the worker's individual powers.

And again, no matter how beautiful the result is, if the work is not the very best that the worker can produce it cannot be regarded as satisfactory. Remember the proverb, " The good is the enemy of the best," which means that a person who is content to do less than his best will be satisfied with second-best all his life, making no effort to improve. A child should not compare his work with that of other children, but with what he could previously do.

It is only if he trains his hands in this way to be the servants of his brain, and uses his intelligence, judgment, patience, perseverance and powers of observation in all his work that he will one day understand what is meant by " The joy of creation."



Specially drawn for this work.

A MUSCLE CELL

The body is made up of countless millions of tiny specks of living material called " cells." These cells are not all alike ; they vary in appearance according to the special work they have to do. Muscle cells are packed closely, like sardines in a tin, and bundles of them are bound together in fibrous sheaths.

HOW THE BODY WORKS

PHYSIOLOGY tells you how your body " works." It would need several large books to tell you *all* about it ; and you would need to spend several years using a microscope and doing experiments to help you to understand what was written in the books. Here it is only possible to give you a very simple and general idea.

A Wonderful Machine.

The body is sometimes said to be like a machine or a motor car. In some few ways this is quite true ; but your body is *much* more wonderful than a machine. A machine can " go," and after a time it wears out ; but it cannot grow, it cannot produce young ones like itself, it cannot repair itself while it is still working, and—above all—it cannot *think*. Every living being, therefore, does some things that no sort of machine can be made to do ; and many living things can think to some extent. No animal, however, can think so well as an adult human being, or even so well as a small child ; so that the human brain is the most wonderful thing in the world.

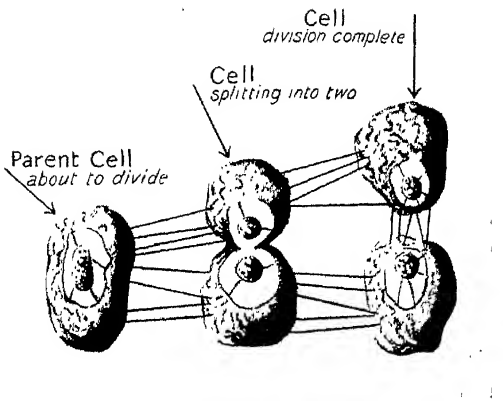
In many ways the body is like a whole nation, consisting of millions of tiny citizens, each working steadily and contentedly at its own special job. Some are members of the government, and some of local committees in charge of certain jobs ; some are members of a defence army ; some are chemists, some scavengers, some messengers, some transport workers ; some are actually little living machines, little living factories and living laboratories ; some occasionally rebel, refuse to stick to their jobs, and attack their neighbours. In fact, nearly the whole work of a nation goes on within your body, except farming and fishing and mining ; for your body has to " import " its food and other " raw materials " ; but here again your body is unlike a machine, for it can decide what it needs, and plan how to supply its needs.

We call the stuff of which our bodies are made " tissue." Thus muscles are made of " muscle tissue," bones of

" bone tissue," and so on. We can recognise the different sorts of tissue under the microscope; for, although they are all composed of cells, the cells of each sort of tissue are different from the cells of other sorts of tissue.

How You Grow.

All living stuff—plant and animal—is composed of cells; and cells, or at least some of them, can exist separately as single cells, which absorb food material from their surroundings, keep what is useful to them, and get rid of the rest—together with their own waste material.



Specially drawn for this work.

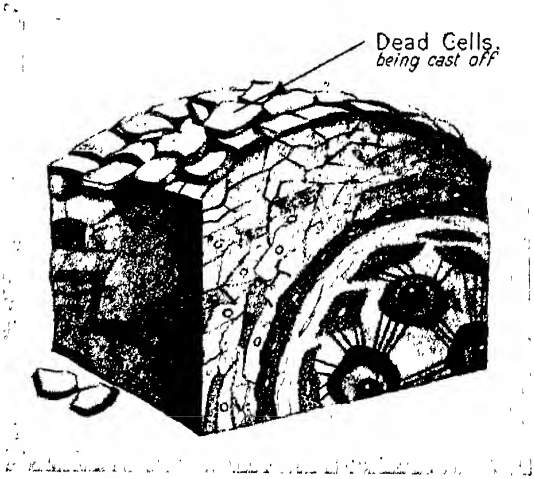
MAKING NEW CELLS

In order to *grow*, you must make new tissue, so that your body can become taller and heavier. You also need new tissue to *repair* yourself, as when your flesh heals after cutting a piece out of your finger. Here you see a parent cell dividing into two daughter cells.

Cells increase by simply dividing into two cells—one cell *becomes* two cells, each exactly like the " parent " cell. *This is how you grow:* your cells divide and divide again, so long as extra tissue is needed—muscle cells divide and increase the number of muscle cells, bone cells divide and make new bone, and so on.

Cells wear out, so that you have to provide material to make good the " wear and tear " as well as material for growth.

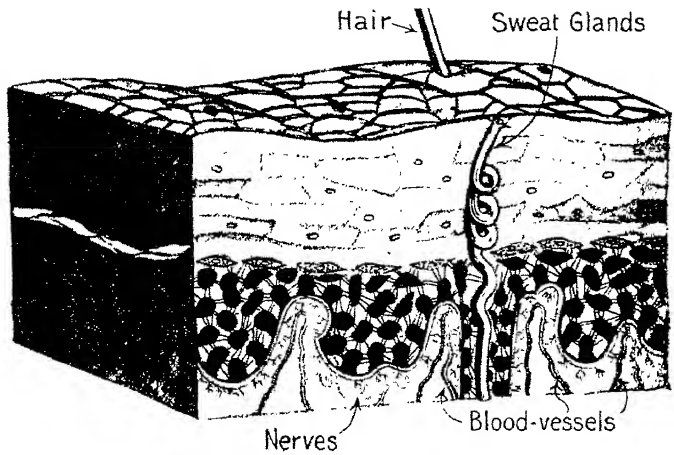
In doing its work a cell uses up fuel, just as a motor engine does. The burning up (" combustion ") takes place without flame, of course; but it needs oxygen (one of the gases in the air we breathe) just as much as an ordinary fire does.



Specially drawn for this work.

WORN-OUT SKIN CELLS

Your skin wears, just like your shoes or clothes—but you repair it yourself by making new cells to replace those that are worn out. Here you see worn-out cells being shed from the surface of the skin.



Specially drawn for this work.

WHAT THE SKIN IS MADE OF

The skin contains many different sorts of tissue The flattened cells on top are called "pavement cells"; they protect the more delicate structures underneath. There are also muscle cells, fat cells, fibre cells, nerves and blood-vessels, hairs, and special glands with long coiled tubes (sweat glands) which open at the pores of the skin. The body gets rid of some of its waste matter in the sweat which comes from the millions of sweat glands in the skin.

The materials for growth and repair and the fuel for energy to do work all come from your food, and this food material is carried round the body by the blood; the oxygen for combustion is carried by the blood too; and all the waste materials of wear and tear and of combustion are removed from the tissues by the blood.

The Framework of the Body.

Steel and concrete, bricks and wood, provide a satisfactory framework for buildings; but the body needs a very special sort of framework. It must be such that it contains strong "houses" for some of the important organs, such as the brain; it must be flexible—capable of movement, and these movements of many different sorts, so that we can walk, use our arms, bend and twist our bodies, and raise, lower and turn our heads; it must be sufficiently strong to stand a good deal of rough usage; and yet it must not be too heavy; and it must, for many years, be able to *grow* and to grow *gradually*. So that it may fulfil all these requirements it is made of that remarkable substance *bone*.

Bone is nearly twice as strong as oak—a cubic inch of hard bone will support a weight of 2 tons. It is elastic, so that it springs back into shape after some degree of bending; in some parts of the world where suitable wood is scarce, the natives use animals' ribs for their bows. If bone is bent so far that it breaks, it can mend itself by growing fresh bone to join up the broken ends. With all this, bone is light in weight.

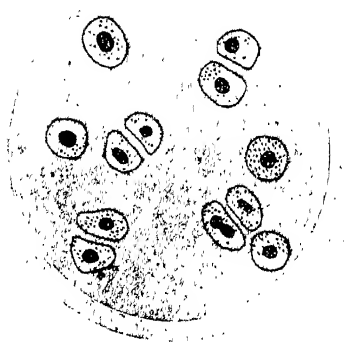
The bony framework is made up of over 200 separate bones, wonderfully jointed and held together by strong bands and muscles. There are joints which work very much like the hinges of a door, which can "open and shut"; your finger joints are examples of this

sort. There are "ball-and-socket" joints (smooth rounded knobs fitting into hollows), like those of the shoulders which allow movement in almost any direction. There are pivot joints, and gliding joints. There is the backbone, which is something like a string of cotton reels separated by layers of india-rubber, and which can bend and twist and yet is sufficiently strong to enable you to drop from a height on to your feet without collapsing into a heap or injuring yourself in any way.

Just as each part of a bridge, designed by an expert engineer, is arranged so as to withstand all the strains and stresses which it will have to bear, so each bone and each joint of your body is so constructed that it can do all that it has to do.

What the Muscles Do.

Over all this bony framework are the muscles. A muscle is able to alter its shape, as you realise when you bend your elbow to display your bulging "biceps" muscle. A muscle lies limp and inactive when it is not doing work; but when necessary it can increase its thickness and at the same time lessen its length. If the two ends of a muscle are attached to two bones, then when the muscle shortens itself it pulls the two bones towards one another. A muscle cannot push—it can only shorten itself and pull, and so you will find that muscles and groups of muscles often work in pairs; as an instance one group of muscles pulls and makes your fingers bend, and another group of muscles pulls and brings your fingers out straight again.



Specially drawn for this work.

CARTILAGE CELLS

The surface of bones which move against one another in a joint are covered with a smooth, glistening tissue called "cartilage." You can see this tissue on the knobs of the drumstick of a chicken before it is cooked.

When you use a machine, it wears out a little. When you use a muscle, it, too, wears out; but your body very soon makes good the wear, so that the muscle does not become smaller—in fact, the more often you make a muscle work hard, the bigger it becomes. You may have envied the magnificent-looking muscles of a blacksmith or a weight-lifter; but, unless you really need these heavy, bulging muscles for your work, it is certainly not worth while trying to develop them. Most of us need a reasonable amount of strength combined with activity and liveliness, and above all, we need general fitness; so that it is wiser to go in for outdoor games than to exercise with heavy dumb-bells.

Our Waterproof Covering.

The whole of the body is protected by a living garment of skin; but the skin is something more than a waterproof covering—it is an organ which has most important work to do.

The skin has fine nerves, which take information to the brain. If you hold your hand too near the fire when you are making toast and are in danger of burning it, the nerves in the skin of your hand flash a message to the brain "We are being burnt!" Your brain at once flashes orders to the necessary muscles, and they snatch your hand away. There are actually separate nerve endings in your skin to receive sensations of heat, cold, and pain, as

well as nerve endings which simply report "touch."

Keeping the Temperature in Order.

The temperature of the body must remain very constant if we are to be in health. A great deal of *surplus* heat is produced in the tissues of the body, and unless this were got rid of we should soon be in a state of high fever and die of "heat-stroke." The skin has a great deal to do with the regulation of the temperature; it assists to keep the right balance between the amount of heat produced and the amount given off by means of its blood-vessels and its sweat glands. The blood which is circulating in the skin blood-vessels gives up a good deal of its heat to the air on the surface of the skin; and the skin can regulate the amount of blood in these vessels by narrowing or widening them. When moisture evaporates, heat is taken up from the surroundings, which become cooler in consequence.

When we are producing a lot of heat during a game, the skin pours out a great deal of sweat which evaporates; and during this evaporation, much heat is taken up from the skin. At the same time, the blood-vessels of the skin widen, bringing more blood to the surface, and so the rate of cooling is increased.

Yet another very important work of the skin is helping to get rid of some of the waste products from the blood; this waste is dissolved in the sweat. In certain diseases, the kidneys—those great blood filters—are unable to work properly; and we can make the skin do extra work, and get rid of the waste which is usually removed by the kidneys.

Why the Blood "Circulates."

"Circulation" means "going round and round." Blood has to keep on going round and round your body as long as you are alive, whether you are awake or asleep. It does not just wander about aimlessly—it is driven



Specially drawn for this work.

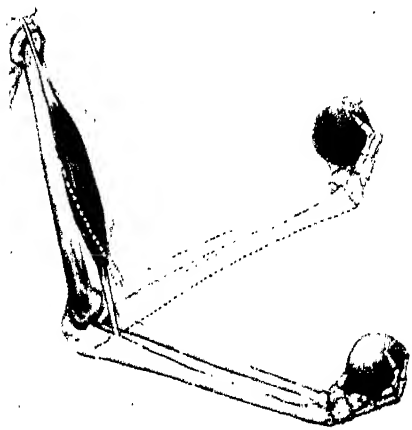
THE TWO LAYERS OF THE SKIN

The triangle shows the smooth, naked-eye appearance of the skin; but when seen through a microscope, it looks like crazy paving, and the surface is uneven. The thick black line in the middle divides the upper skin (epidermis) from the true skin (dermis) which contains the sweat glands, blood-vessels and nerves. You can see the capillaries joining the arteries and veins.

round along certain paths, collected up again, sent out to be "cleaned and renovated" (so to speak), collected up again, and then sent out on another journey. The "organ" which keeps the circulation going is the heart.

The heart is more than a single pump. It is a very powerful muscular organ, containing two separate receiving chambers and two separate pumping chambers. There are special names for all these chambers, but we need not bother about them here.

For No. 1 pumping chamber the blood is forced out in jerks into a great blood-pipe or "blood-vessel," which divides and subdivides into smaller and smaller pipes, which carry the blood all over the body. These blood-vessels which carry blood *from* the heart are called "arteries." The pipes become so small finally that they are called "capillaries" or hair-like blood-vessels; they form a complete network in every part of the body, but they can only be seen by means of a microscope.



Specially drawn for this work.

HOW A MUSCLE MAKES YOU MOVE

When you contract your biceps, it pulls in its attachments. As it cannot pull your shoulder down towards your elbow, the resulting movement takes place at the other attached end of the muscle, and your forearm is raised.

The blood from the capillaries moves on, and the capillaries join up into larger and larger blood-vessels which at last return the blood to No. 1 receiving chamber of the heart. The pipes which carry blood *to* the heart are called "veins."

From No. 1 receiving chamber the blood is forced into No. 2 pumping chamber, and from there it is pumped into the lungs through an artery, which divides and then subdivides into capillaries; and these form a network throughout the lungs. The blood collects up again into veins, and finally into one vein, which takes it back to No. 2 receiving chamber of the heart. From No. 2 receiving chamber the blood is forced into No. 1 pumping chamber, and then the whole business is repeated.

You will notice that there are already *two* circulations—one from the heart, round the body, and back to the heart, and the other from the heart, to the lungs, and back to the heart. There is yet a third circulation, which will be mentioned later.

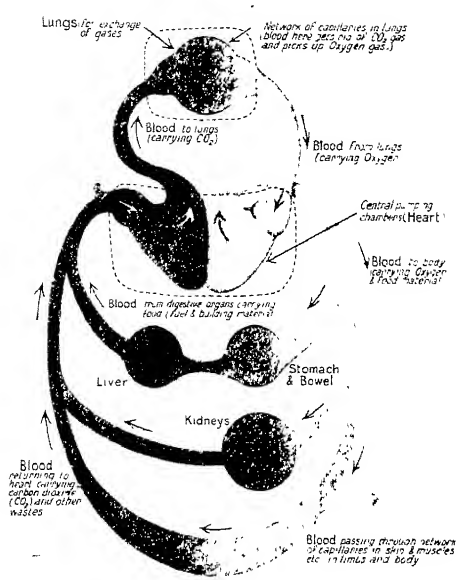
Why Blood is Red.

The blood does so many things, and so much happens to it, that it is really difficult to know where to begin. If it were just plain red stuff like paint, and we could imagine that we were watching a single drop of it for half an hour or so, it would be quite easy; but it is not just plain red stuff, and the parts of even a tiny drop probably do not remain the same for any length of time. Blood consists of a clear fluid containing fuel material, repair material, waste

material and many other things; and floating along in this fluid are millions of tiny white cells, and many more millions of tiny disc-like red cells which give it its colour; and all the time the blood is doing things—giving up some of itself and receiving stuff into itself.

Perhaps we could follow one red cell for a while. It was made in some part of the bone marrow, but we will begin following it from one of its visits to the No. 1 pumping chamber of the heart. With many millions of other red cells it is pumped out into a huge artery, and tumbled along jerkily into ever-narrowing blood-vessels until at last it is moving in a capillary which winds its way among the cells of a muscle which is being used. The capillary is so small that there is only just room for one red cell to pass along it at a time, and even then it is a close fit, so that the red cell touches the walls of the capillary. Each muscle cell is like a tiny motor engine, and it needs oxygen to enable it to burn up fuel material to provide it with the energy or power-to-work. Now the red cell is carrying oxygen—not in bubbles, but dissolved, so to speak; and it is able to give up this oxygen, which oozes through the walls of the capillary and is used by the muscle cell.

The muscle cell, like the motor engine, gives off "exhaust gas," which oozes through the walls of the capillary and is taken up by the red cell. Our red cell—no longer such a bright red as it was when it was carrying oxygen—is pushed along and passes into a tiny vein which in turn passes it into a larger vein, until at last it is tipped back into No. 1 receiving chamber of the heart. From the heart it will be sent off to the lungs; what happens to it there will be told later on. Here we will just say that when it returns from the lungs to the heart it will again be of a nice bright red colour, and all ready to be sent off to some part of the body to carry out some other task.



Specially drawn for this work.

THE CIRCULATION OF THE BLOOD

The blood makes two journeys; one to the lungs, to collect oxygen and get rid of carbon dioxide, and the other throughout all the body tissues and organs, to deliver food and oxygen and collect up carbon dioxide and other wastes—like the milkman who delivers milk and at the same time collects up the empty bottles.

Lymph and What it Does.

Now let us follow a tiny drop of the

clear fluid in which this red cell was floating. It, too, reaches the capillary close to the muscle cell where the red cell carried out its task. Some of it oozes through the capillary wall, and round the muscle cell. The muscle cell needs some of the fuel material, just as the motor engine needs petrol; this fuel it absorbs from the clear fluid, together with a little repair material. The rest of the clear fluid moves on and is picked up into tiny tubes, which are very similar to the capillaries; and these tiny tubes join up into bigger and bigger tubes and finally into one large tube; and this empties the clear fluid back into a vein which is just taking blood back into the heart. This is the third "circulation" we mentioned. The clear fluid (which is called "lymph") goes out from the heart with the blood as far as the capillaries, but it then travels along a whole lot of tubes which are not used by the blood. It joins the blood again just before it reaches the heart.

The White Soldier Cells.

The journey of a white cell may be more exciting than that of a red cell; for this white cell may have to act as a soldier, and defend the body from dangerous invaders. When a thorn sticks into your fingers there may be harmful cells or germs on the thorn, or on your skin, or in the air, and these may enter through the hole in your skin. Now the white cell can change its shape; when it meets a hostile cell it tries to flow all round it and then consume it. If there are sufficient white cells on the spot to destroy all the invading germs, well and good, but sometimes the enemies are strong and numerous, and many white cells are killed by them. Your body, however, hurries along more and more white cells to the spot, until at last they gain the victory.

You will have noticed that sometimes when you have pricked your finger it becomes hot and red and "inflamed"; this is because of the increase in the amount of blood sent to the danger spot. You may also have noticed some yellowish "matter"; this consists of dead white cells which have been slain in doing their duty.

These three are simply examples of the many tasks which the blood has to perform. A complete list of them would take quite a time, but here is a short and incomplete list:

Some Tasks our Blood Performs.

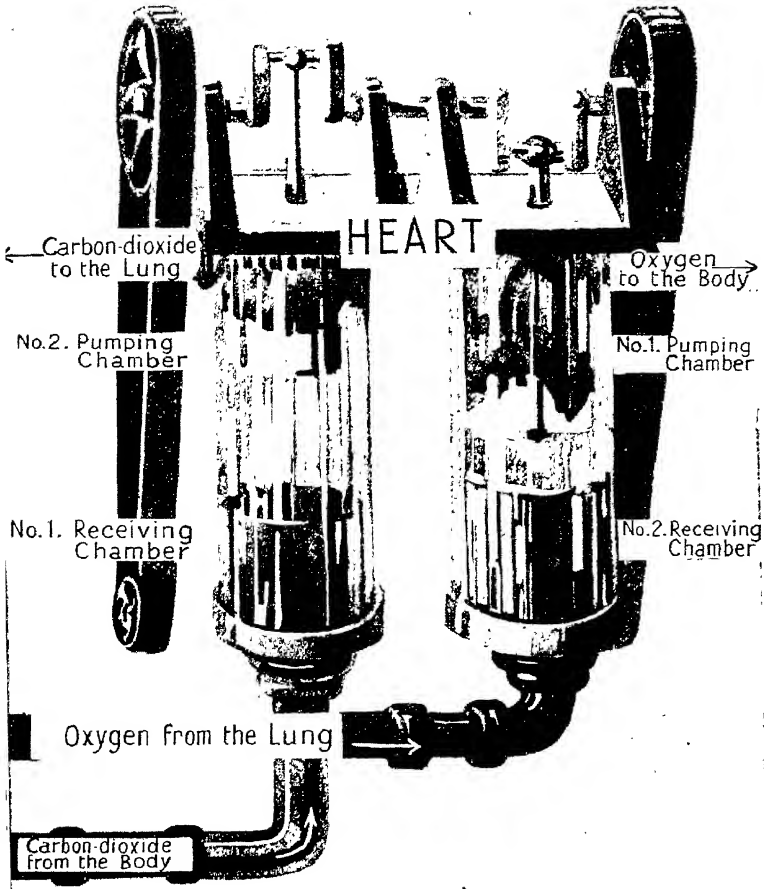
The blood has to collect up into itself the digested food from the digestive organs, and the red and white cells from the parts where they are made, and oxygen from the lungs, and it has to carry away waste materials from the tissues. It has to supply all the organs and glands, which act as little chemical factories and laboratories, with the material from which they make their special juices, and it has to take some of these juices round to the parts where they are needed.

It carries various protective substances ("anti-toxins," etc.) which are able to destroy the poisons with which harmful germs may be attacking us. It visits various cleansing and filtering organs, where it parts with harmful waste matter, and also with any substance of which there is too much, for the health of the body requires that only a certain amount of some substances should be present in the blood, and if there is too much the body suffers. It carries sugar and starch to be stored up in the liver and muscles, so that there is a supply ready for use when it is needed; and when necessary, it fetches these reserves and delivers them to the places where the body needs to use them.

It visits the heart frequently, and there it is all mixed up together, so that its contents remain very much the same all over the body.

Many of these things are going on all the time and some of them only sometimes; and, of course, the body

WHAT THE HEART DOES



Specially drawn for this work.

If there were no means of keeping the blood circulating along its proper channels we should soon die for want of food and oxygen and from poisoning from our waste products. The heart is a powerful muscular organ which is specialised to form a central pumping station. One pump keeps the blood circulating through the lungs, and the other pump maintains the circulation through the body. The heart never ceases work during life, but it has much less work to do when you are sleeping than when you are taking vigorous muscular exercise.

can speed up things according to its needs. When you have just eaten a meal, for instance, there is a great bustle to supply digestive juices, and to supply fuel material for the organs which have to manufacture the juices and for the organs which have to churn up the digesting food. When you are running, much fuel has to be used up, so that a great deal of oxygen is needed; you must breathe quickly and deeply, and your heart must hurry up the circulation to the lungs. When you are asleep, on the other hand, both your breathing and your heart-beats slow down very much.

It is almost impossible to compare the blood with anything else in the world. In some ways it is like the water of a whole network of inland rivers and canals and streams, flowing past or through factories, carrying large loads of all sorts of things to these factories and taking away their waste; carrying messengers and troops and workmen; in fact, making possible the whole business of carrying on life; but even this does not give anything like a complete picture of *all* that the blood does.

Why You Breathe.

Respiration is the breathing in of air into our chests and the breathing of it out again.

The air is composed almost entirely of two gases. About one-fifth is oxygen, which is a very *live* sort of gas; of course, a gas cannot itself be alive, but oxygen strikes us as being a very active sort of gas because of what it does. If you plunge a glowing splinter of wood into a jar of oxygen it at once kindles into flame and burns brightly; if you plunge a thin, red-hot iron wire into oxygen it sparkles, splutters and burns like a firework. It is this gas which your tiny muscle cells must have so that they can burn up fuel material to make energy or power-to-work. Most of the other part of the air is a dead sort of gas which just thins out or dilutes the oxygen; for if we took too much oxygen, everything in the body would go on much too rapidly, and we should wear out too soon.

When fuel material of any sort burns, it combines or joins up with the oxygen; and the fuel and the oxygen together become another sort of gas, which is called "carbon dioxide"; (this is sometimes written CO_2 for short). It is this gas which we compared to the exhaust gas of a motor engine, when we were talking about the working of the tiny muscle cell. You will remember that the red cell gave up oxygen to the muscle cell and took away the "exhaust gas," which we can now call carbon dioxide.

How the Red Cells Work.

We must now see how the red cell gets rid of the carbon dioxide and takes in a fresh supply of oxygen; for this is the whole aim and object of respiration, and the exchange must be carried on continuously or you will cease to live.

When you "breathe in," you take in air through your nose. You *can* breathe through your mouth; but this is unwise, because in your nose the air is warmed and moistened and the germs and dust are trapped. The air passes into a great pipe, which divides into two pipes, one of which goes to the right lung and the other to the left lung. These pipes divide up into smaller and smaller pipes, very much as the blood-vessels do; but, instead of becoming capillaries finally they end in tiny air-sacs.

The lungs are sometimes said to be like sponges; but they are much more like thick bushes with very tiny leaves, with pipes instead of stems, and air-sacs intead of leaves. If all these air-sacs could be spread out quite flat they would cover the floor of a small hall about 10 yards long and 10 yards wide; as they are all packed inside your chest it is plain that the walls of the air-sacs are extremely thin.

You will remember that the heart

pumps the blood into the lungs when it returns from a journey to some part of the body, carrying within its red cells the carbon dioxide. The arteries which carry this blood to the lungs split up into smaller and smaller blood-vessels until they become capillaries, and these capillaries run round all the little air sacs. The red cells give up their carbon dioxide, which oozes through the walls of the capillaries and through the walls of the air-sacs; at the same time the oxygen from the air-sacs oozes through into the red cells. The red cells, having exchanged their carbon dioxide for fresh oxygen, are gathered up again into blood-vessels and taken back to the heart, all ready to be sent off to some part of the body again.

Preparing the Air.

When you "breathe out," the carbon dioxide passes out through your nose. The dead sort of gas we mentioned is just breathed in and breathed out again; it does nothing and nothing happens to it except that it becomes warmed. There is a good deal of moisture in the air you breathe out. If you think for a moment, you will find that nearly all living stuff is moist; moisture seems to be necessary to life, or at least to active life, and so the whole of the cells which compose your body are always moist. The air brings a lot of moisture with it when it comes away from the millions of tiny air-sacs.

You see that the organs which keep you supplied with oxygen and get rid of your "exhaust gas" are the *heart*—which sends the blood to the lungs and then receives it back again, and the *lungs*—there the actual exchange of gases takes place; but we must not forget the *nose*, which has important work to do in preparing the air to be taken into the lungs.

Quite probably you think that you "blow out your chest" by forcing air into it until it is full and hard; but this is not so. The muscles of your chest move the ribs and make the chest bigger round, while a great flat muscle which forms the base of the chest lowers itself and so makes the chest bigger from below. The lungs fit closely to the insides of the chest, although they are not actually attached; and so, when the chest becomes bigger, the lungs are sucked out, so to speak; and it is this that makes them suck air into the air-sacs. You *can* breathe without moving your ribs; but then you are only using the big flat muscle at the base of the chest, and you have to lower this and so push out your stomach.

The muscular movements by means of which you breathe must go on all the time you are alive; and as they work while you are asleep, they must be able to work without your "willing" them to work. You will read later on that quite a lot of the work of the body goes on without your having to "will" it; but the breathing muscles are interesting in that you can control them if you wish to do so; while if you take no interest in them they go on working just as well.

How the Body deals with its Food.

The material from which a machine is made and with which it is repaired has to be specially prepared before it can be used; and sometimes its fuel also is a manufactured article. Your body, the wonderful human machine, extracts and prepares its own fuel and building materials provided that we supply the "raw material" in the form of suitable food. Just as a builder needs special material in order to build a house, so our bodies need food which will supply the living bricks and mortar and tiles and window-glass and wooden beams for building up the living house which we occupy, and for repairing it when parts get broken or worn out, and for enlarging it as we grow.

The baby doubles its weight during the first six months of life, and by the end of the first year it should weigh three times as much as when it was born: afterwards, the rate of growth

slows down considerably until, when we are adults, the only parts that continue to grow are the hair and nails. The baby, then, needs a good supply of the building foods; and these, together with its fuel food, it obtains from milk. You probably know that milk is a splendid body-building food for boys and girls and grown-ups as well as for babies; but people with teeth need solid foods, too, and they can extract the building materials from such foods as meat, fish, eggs, cheese, peas, beans and lentils. Then we need also "fuel foods" to supply heat energy and work energy, and these we get from the starches and sugars (carbohydrates) and fats.

I want you to realise that the food we eat is of no use to nourish the body until it has been digested and absorbed into the blood. You could actually starve to death in spite of large meals of unsuitable food—or even of suitable food if your digestion were unable to deal with it.

Let us see what will happen to the next dinner we eat. In order to make it quite clear to you, the pictures show the work being done by different kinds of machinery in charge of workmen; but you realise, of course, that your body machinery looks altogether different and that your "workmen" are cells and groups of cells.

Why We Chew our Food.

In the mouth, your front teeth are the "cutters" which slice off portions of food. This food is then passed along by your tongue and cheek muscles to be crushed up by your back teeth, the "grinders"; and while you are chewing your food, it is being mixed with a digestive juice, the saliva or "spit," which acts on some of the starchy food; so you see digestion really begins in the mouth.

When the food has been chewed to a pulp and thoroughly mixed with saliva, it is ready for the next stage of digestion, which takes place in the stomach. The tongue pushes the food to the back of the throat and it is swallowed. Now the food has to make its way down the food pipe which passes through the neck and chest to the stomach. Certain muscles in the throat and a cleverly arranged little flap prevent the food from going the wrong way from the mouth when we swallow; otherwise, some of the food might pass into the air-pipe leading to the lungs. When, as occasionally happens, a crumb does accidentally get into the air-pipe, we make vigorous efforts to send it back again into the mouth by coughing.

What Happens to the Things We Eat.

Now the food which has passed from your mouth does not just drop down into the stomach; as you know, you can swallow when you are lying down. It is pushed along by the muscular walls of the food tube, which widens out in front of the lump of food, so that it can pass along easily, and contracts itself immediately behind the food. You can imitate this by pushing an orange into a stocking and then squeezing the stocking behind it.

Your dinner will thus be collected into the stomach, which is really a part of your digestive tube enlarged so as to form a bag, with an upper opening leading to the food tube and a lower one leading to the small bowel. The lower door remains firmly closed while the meal is being well churned and mixed with other digestive juices which together are called "the gastric juice," and act on the body-building foods ("proteins").

When the stomach part of digestion is finished, the door opening into the bowel tube allows the contents to pass through, and bowel digestion begins. Our picture shows a little man controlling this doorway. In the small bowel, more digestive juices are poured on food, some from the liver and some from the pancreas, and some from the lining of the tube itself. When we use the pancreas of an animal for food we call it sweetbread.

Here, in the bowel, digestion is completed; the food is quite dissolved, and you could no longer recognise portions of meat and cabbage and potato and pudding! The starches and sugars (bread, potatoes, jam, syrup, etc.) are changed into a special form of sugar; the fats (fat meat, suet, butter, cream, etc.) are changed into a kind of soap (the "soap" is changed back into fat as soon as it has passed through the bowel); and the building materials (meat, fish, egg white, etc.) are prepared into an acid substance. Now the food is ready for use, and it passes into the circulation. The remainder of the food we have eaten, which is not required for nourishment, is got rid of through the large bowel.



Specially drawn for this work.

DIGESTION BEGINS IN THE MOUTH

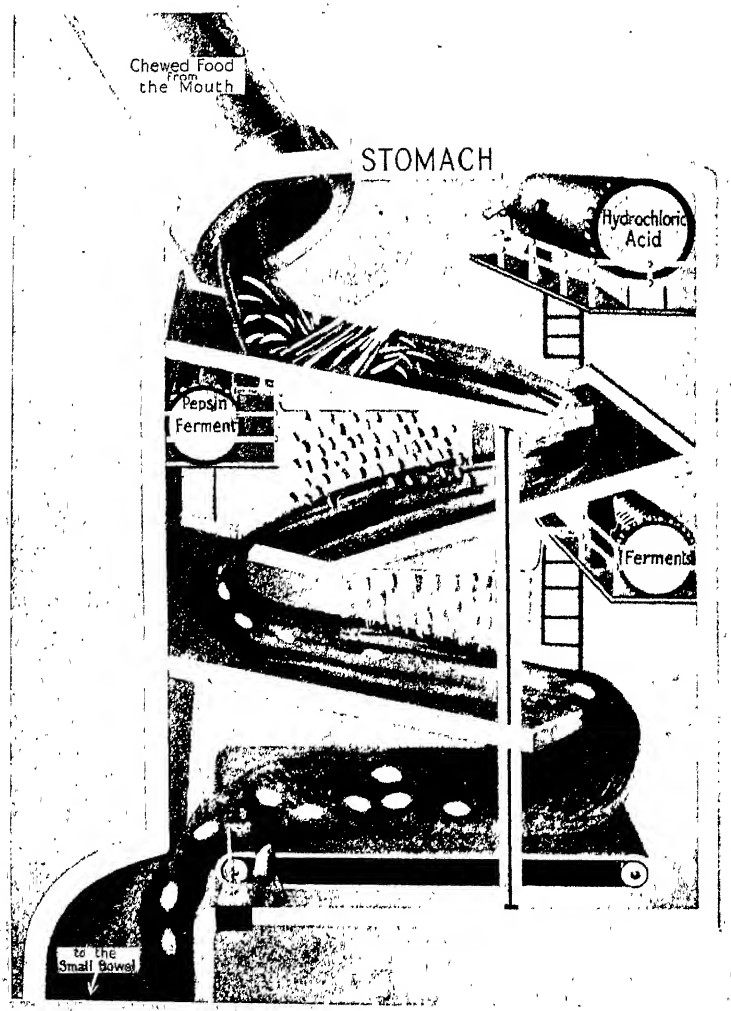
The front teeth are represented by the knife which is slicing off a portion of food. The food is then mixed with a digestive juice (saliva) and passed through the grinding rollers (back teeth). Thus food in the mouth is broken up, softened and moistened and partially digested during mastication. The saliva changes some of the starchy foods, such as bread, cereals and potatoes, into a form of sugar.

Why the Liver is Important.

It is most important that the body should never be short of fuel, and so we are able to store sugar in the liver, to be released into the blood as we need it; some sugar is stored in the muscles also. The sugar is stored in the form of a special kind of starch, and it is changed back again into sugar before it is actually used. In the picture of the liver you will see the sugar being brought along from the bowel in the blood-pipe; and on the right of the picture you will see some of it taken out of store again and sent off to be used. We are also able to store fat in various parts of the body.

Other things happen in the liver, besides this storage of sugar. Worn-out red blood cells are extracted from the blood and pass out of the liver in the bile. Any excess of building material is filtered out of the blood, and changed into a form in which it can be got rid of through the kidneys. Certain poisons

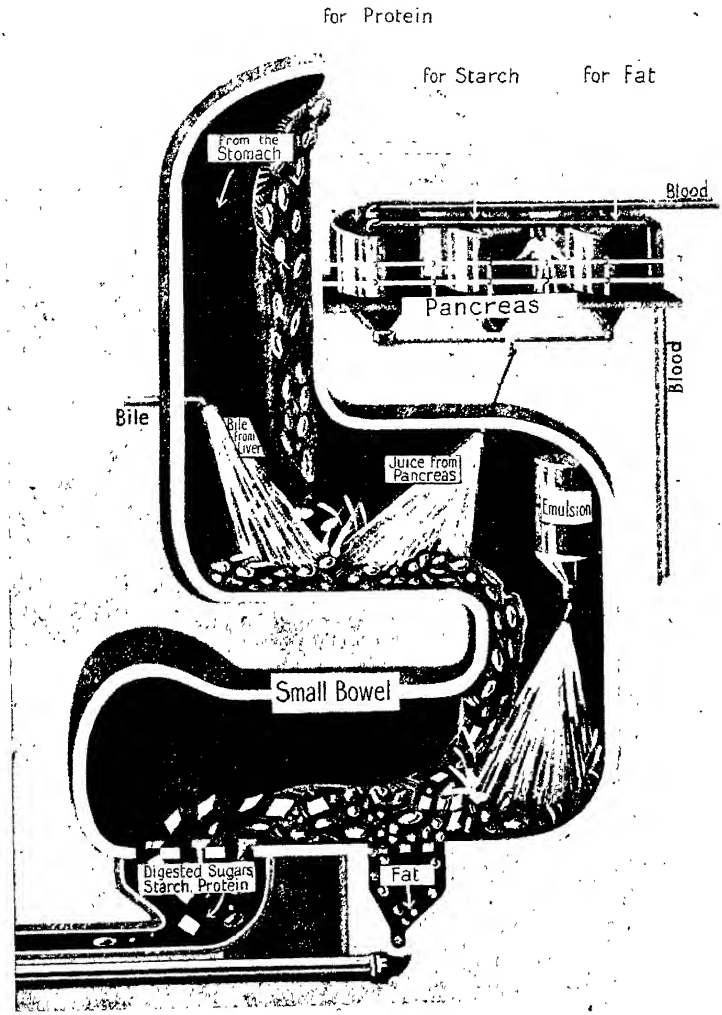
WHAT HAPPENS IN THE STOMACH



Specially drawn for this work.

You see food arriving from the food pipe into the stomach; and there it will remain until stomach digestion is completed. By movements of the muscular stomach wall, the food is thoroughly mixed with the gastric digestive juices, which include an acid (HCl), pepsin and other ferments. (1) Living germs swallowed with the food are killed by the acid. (2) Digestion of protein (body-building and repairing food) begins. (3) The outer coats of the fat cells are dissolved, setting free the fat. (4) Milk is curdled. The stomach should have emptied in three to four hours after an ordinary mixed meal.

DIGESTION COMPLETED IN THE SMALL BOWEL



Specially drawn for this work.

On leaving the stomach, the food enters the small bowel, where bile from the liver makes fats more easily dealt with, the juice of the pancreas acts on all kinds of foods, and the juice from glands in the wall of the bowel completes digestion. While this is happening, the food is being churned up and pushed along towards the large bowel; and about five hours after a meal, the undigested waste of the food begins to enter the large bowel. The digested food is taken into the circulating blood, and is then carried to the liver for a thorough sorting out.

(which we call "toxins") are also removed from the blood as it passes through the liver, and are excreted, through the bile flow, into the bowel. The liver, then, has a great deal of important work to do; and you will understand why we feel "out of sorts" when the liver is not working well.

The blood passes on from the liver to the heart with its food supply (fuel and building material) ready to be used by the body cells; but the fuel part of it would be useless without oxygen, so the blood is pumped from the heart to the lungs, where the red cells may get a supply of oxygen from the air we have breathed in. Now everything is ready for the body to make use of the food, and the blood is taken back from the lungs to the heart to be pumped round, carrying its precious cargoes to all the parts of the body. When it reaches the tiny capillary blood-pipes, the red cells give up their oxygen and the fluid part of the blood oozes out to bathe the body cells. Thus the fuel and oxygen to supply heat and energy, and the building material to repair wear and tear, and material for growth, are finally delivered where they are needed.

All about Vitamins.

We have talked of the fuel-foods and the building-material foods; but these alone are not sufficient to keep us alive. We need minute quantities of substances called vitamins. You can think of some of these as the lubricating oil necessary for the body machinery; without them the machinery would cease to work, no matter how much fuel-food was provided. Others are necessary to enable the body to use the building-material for growth.

Some vitamins are found in certain fatty foods, others in watery foods; the first kind we call "fat-soluble" vitamins, and the second "water-soluble" vitamins. The vitamin which prevents the disease rickets ("fat-soluble D") is found in most animal fats, and especially in cod and other fish liver oils, liver, fish roe, egg yolk (which contains a large proportion of fat) and in the butter and cream from the milk of pasture-fed cows. This vitamin is sometimes called "the sunshine vitamin," because it can be produced in the body by the action of sunlight on the skin. We can store this vitamin in our bodies; so that one advantage of sun-bathing during the summer is that we obtain a supply of vitamin D to help us over the winter.

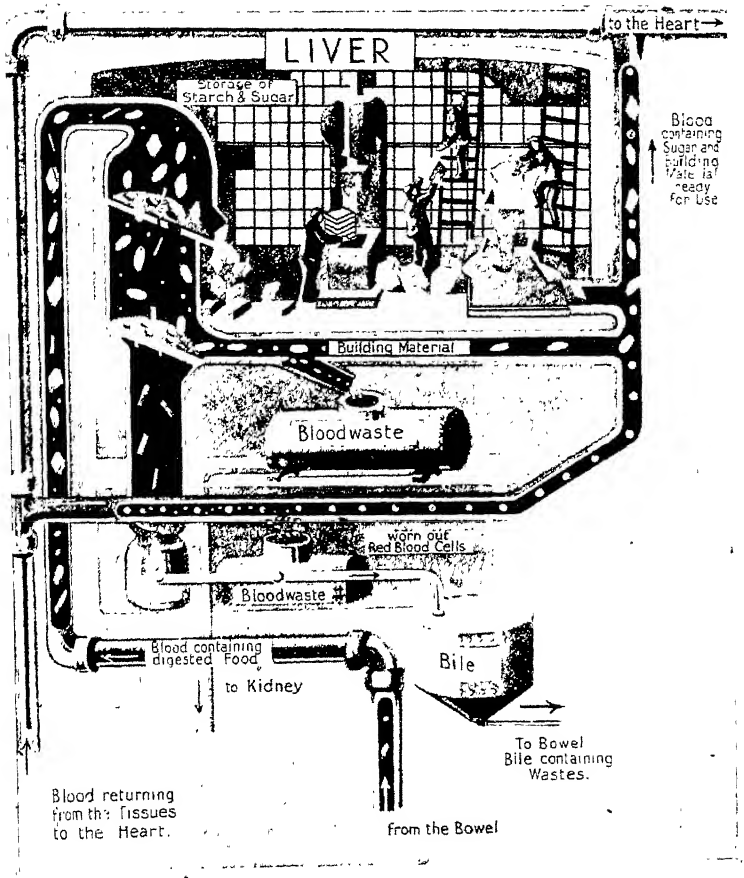
Defence against Germs.

The other fat-soluble vitamin is named "A"; it assists us in defending our bodies against infection with germs. If our food contains sufficient of this vitamin, we are less likely to develop diseases and better able to conquer them than if there is a shortage. Vitamin A is found in the fat foods which contain vitamin D, and also in green vegetables, carrots and tomatoes.

The water-soluble vitamins include vitamin B, which is necessary for the proper nutrition of the nerves and muscles. Lack of this vitamin causes the disease beri-beri, which is quite common in the East. Vitamin B is found in the seeds of plants, and in the eggs and internal organs of animals. Foods particularly rich in this vitamin are yeast, bran, peanuts, dried peas, beans and lentils, nuts, liver, heart and kidney, and whole-grain cereals, such as wholemeal flour and wholemeal bread.

Vitamin C is another water-soluble vitamin, and lack of this causes the disease scurvy, a disease which used to cause the deaths of a great many sailors in the Navy, before we discovered the cause and the cure. It is found in fresh fruits and vegetables.

On a good mixed diet, including milk and dairy produce, eggs, salads, oranges, tomatoes, nuts and whole-grain cereal foods (such as wholemeal bread, unpolished rice and whole barley), we are in no danger of suffering from shortage of vitamins. If, however, we eat mostly "refined" foods from which vitamins



Specially drawn for this work.

THE WORK OF THE LIVER

The liver is a large gland which acts as a sort of clearing-house and store-house, where the digested food and any other material brought from the bowel is thoroughly sorted and dealt with. Some is passed on into the blood to supply the body with nourishment; some is stored, to be given out again as required; whilst some is rejected as poisonous, and sent out to be got rid of by the kidneys or in the bile. In addition, the liver filters off the worn-out red blood cells, which also pass out in the bile.

and minerals have been removed in the manufacturing processes, then the body machine will certainly be injured and we shall suffer from ill-health.

In order to maintain normal health and growth, we must eat food from which the body can get all that it needs —fuel, building material, minerals, vitamins and water. We cannot get all the water we need from food, although some foods contain up to 90 per cent. of water; we must drink water, too.

Now you can understand what is meant by a "balanced diet." There is no doubt that a great many of the common ailments are caused by not eating the right kind of food.

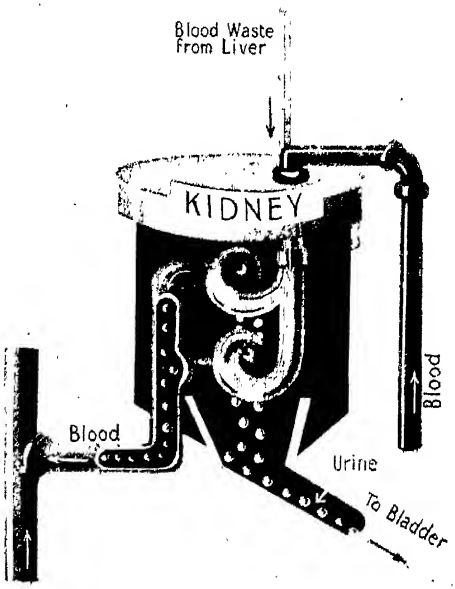
Removal of Waste.

The body, like all living matter, produces waste; and if the waste matter is not got rid of regularly, poisons will accumulate in the blood. Our bodies have their own "health service" for getting rid of wastes, and the organs which are responsible for this function are called "excretory organs."

The living substance of which the body cells are composed (protoplasm) is in a continual state of activity, building up and breaking down. The waste products from this "wear and tear" are passed into the blood, which in due course flows through the excretory organs—the kidneys, lungs, skin and bowel wall. From the burning up of the fuel foods to produce heat-energy and work-energy, the waste gas, carbon dioxide, is formed, and this, too, finds its way into the blood, to be carried off and excreted through the lungs in the air we breathe out.

If you look at the picture of the liver, you will see that certain wastes are filtered off from the blood and drained into the bile, to be got rid of when the bile flows into the small bowel. The kidneys (there are two) are special filters, composed of masses of tiny tubes and specialised cells. They cleanse the blood which flows through them, and the waste products are excreted in the urine.

The waste matter which leaves the body through the bowel includes the undigested food, secretions from the bowel wall, large numbers of germs (mostly dead ones) and cells shed from the inner surface of the bowel.

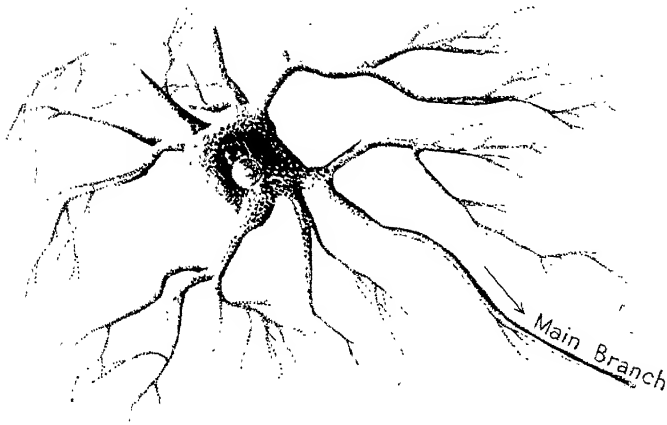


Specially drawn for this work.

THE KIDNEY

The kidney is a living filter. The tiny balls passing down to the bladder represent the waste material; the other balls passing along the blood-pipe which leaves the kidneys are materials the body needs. The kidney is able to sort out the things carried by the blood, rejecting what is harmful, and retaining what is useful. Actually, the kidney is packed with thousands of tiny coiled tubes.

YOUR NERVOUS SYSTEM



Specially drawn for this work.

A NERVE CELL

These are the cells which are found in your brain and spinal cord. You see how different they are from muscle or cartilage cells. The long main branches of nerve cells are bound together in bundles to form nerve. By means of these nerve cells and their branches, the brain and spinal cord, which form a sort of central government, are kept in touch with what is happening to the rest of your body.

YOU will by now agree that the body is in many ways like a great nation, with millions and millions of citizen cells, each one carrying on its work for the good of the whole, whether it is working as a single cell (like a red blood cell) or as one of a group (like a muscle cell or a gland cell). A nation needs some form of government, and such a well-run nation as your body needs a very efficient government indeed.

How your Body is Controlled.

The work of governing is done by cells—*nerve* cells. These nerve cells vary a good deal in size and shape, but you can form a fair mental picture of one if you imagine a tiny white or grey cell, with no very regular sort of shape, and having many branching fibres and one long fibre; the long fibre may be very long, and bundles of fibres lying alongside one another are called "nerves." The whole of your bodily outfit of nerves and nerve cells together is your "nervous system"; and the great gathering of nerve cells in your skull, together with its continuation down inside your spine, is called the "central nervous system."

You may regard the central nervous system as being the government, with the brain as the thinking, knowing, remembering, considering, deciding and willing departments; while the spinal cord may be compared to county councils or some such subordinate controlling bodies. The great network of nerves and nerve cells throughout your body gathers information *from* every part, and takes instructions *to* every part.

You will readily understand that a

central government should not be troubled too much about routine affairs —jobs that have to be done in very much the same way, day after day. It is much better for some subordinate council or department or officials to look after such things; and so you find, in your body, that such things as breathing, digestion and the circulation, and other matters, are controlled and regulated without your having to "give your mind" to them.

It is, roughly, true to say that the whole of the actual "running" of the body, the *internal* affairs of the nation, so to speak, are carried out in this way. Your mind does not concern itself with them unless things are going wrong, and in some cases your mind cannot interfere with them, at least, to any great extent. Nevertheless, everything is conducted in a perfectly orderly and controlled manner—by means of nerves and nerve cells and groups of nerve cells; the needs of the body are noticed and reported, and the necessary instructions are given without your *knowing* anything about it.

Why Exercise makes us Breathe more Quickly.

If you are exercising much, there is increased combustion in the muscle cells, and, because of this, a tendency for the carbon dioxide in the blood to increase; the increase in carbon dioxide causes the breathing control to send instructions to the breathing muscles to work extra hard; in consequence of this you breathe more quickly and more deeply, and the extra carbon dioxide is the more rapidly exchanged for fresh supplies of oxygen; and of course your heart has to work harder and faster too. All that you *know* about this is that you breathe faster, and that your heart beats more rapidly. The same hurrying-up of the breathing will take place when you are very high in the mountains where the air is rarefied and you are not getting as much oxygen as you want.

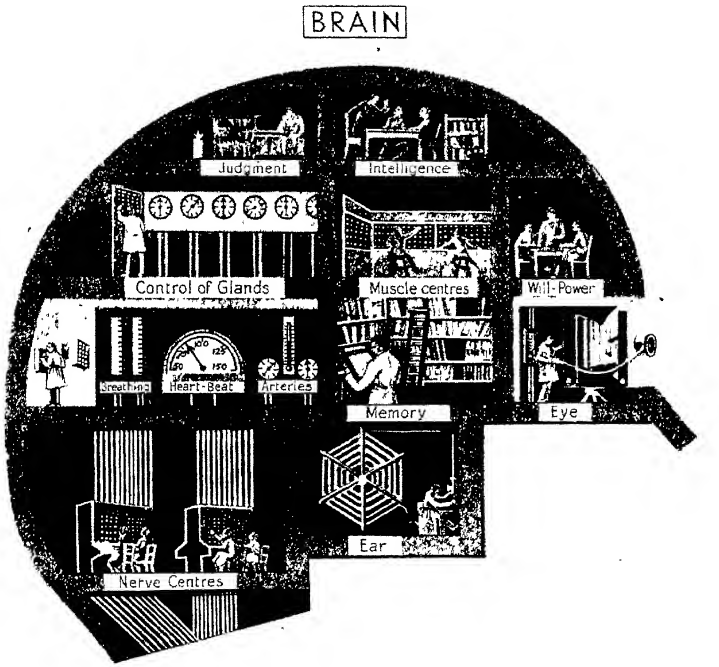
Many actions you have to think about at first - walking downstairs, guiding a pencil, playing on the piano; and some of them are so difficult that you have to give your whole mind to them. Yet, after a time and "with practice," as we say, these things become almost as easy and automatic as breathing. It is as though the mind had been able to say to some other part of the nervous system: "There you are! That's the way to do that. Just you carry on and see that it is done in the same way whenever I want it done and don't bother me about it."

Why We Sneeze.

We have not yet finished with the things that are done without your having to "give your mind" to them. If you happen to sniff pepper you will sneeze. Exactly what has happened? The nerve cells whose job it is to report have sent back a message, "Something here is upsetting us!" The message goes to some local control centre, and from this instructions are sent out to all the muscles which have to act to make a sneeze "Get busy, and blow that stuff out of the nose—Sharp!" You don't have to *think* about this—in fact most people can't sneeze to order; you can, however, stop a sneeze sometimes, which shows that your mind *can* exercise some control.

Again, if someone puts a drawing pin on your chair you don't wait to think about it. Your whole body leaps up —*before you know what it is all about.* Perhaps we had better not imagine the messages which might be sent in this case. This leap of your whole body, because something has hurt some part of it, shows you how well the communications of the whole body are arranged; it is almost as though every part is always on the telephone to every other part, but only gives attention where and when there is need.

These actions in which some cause or "stimulus" leads to some effect or



Specially drawn for this work.

THE BRAIN

The brain can be compared to the headquarters of the government, with its various departments, each with definite functions. It receives reports and sends out orders. It controls the muscles, the glands, the beating of the heart, the action of breathing. It registers what we see and what we hear. It is the seat of the higher functions of judgment, intelligence and will-power.

"response" without your having to think about it, are known as "reflex" actions. You will be able to think of a great many of them.

The Work of the Brain.

We have left to the last that part of the government which has to feel, know, remember, consider, decide, and will. It is here that the human being is so superior to the other animals; these can breathe and digest, and have a whole outfit of reflex actions, and up to a point they can think; but none of them can compare for a moment with the human being in the qualities of the mind. The mind is not a bit of the brain; it is, rather, the word by which we described some of the things the brain can *do*—we might almost describe the mind as a *property or quality of the brain.*

We have already shown that the *internal* affairs are carried on without your having to give your mind to them; and so we may now say that the mind concerns itself mainly with *external* affairs—the things that have to

be done so that the body can take advantage of its surroundings; among these affairs we must include the seeking of food, the avoiding or warding off of danger, and so on. Of course, the mind goes far beyond this, and thinks of music, art, astronomy, right and wrong, and thousands of other things—but the more backward and uncivilised races still give most of *their* minds to their physical needs, and to the "struggle to survive."

Your mind must have information of all the surroundings, and this information it gains through special "sense organs." If you can imagine a human being who had never been able to see, hear, smell or feel, you can see that he would almost certainly be an idiot.

Your sense organs, then, gather information. Your eyes are like tiny cameras which take moving pictures and send them to your brain; your ears notice and report vibrations of the air; your nose detects and reports smells; your mouth tastes; while your skin reports heat, cold, touch and pain. All the information is actually picked up by nerve cells and their fibres, and it is understood and remembered by nerve cells in your brain. The pictures "taken" by your eyes are conveyed to the brain, and it is there that you really "see"—that is to say, it is there that you know what the picture is and what it means; the same is true of the other sense impressions—you see, hear, smell, feel, and taste *with* your brain, though you are enabled to do these things by means of your eyes and other sense organs.

Your Cells as Citizens.

Our illustration of the government is not, of course, a true picture of the brain. There are definite "centres" within the brain which are concerned with special senses and organs and activities, but everything is so very complicated and so linked up with other things that it is impossible to give a true picture. The body has been likened to a nation, the cells to citizens, the central nervous system to the government, and so on—but this has been done in order to make it possible to tell simply about things which are very far from being simple.

The Influence of the Glands.

Fifty years ago no one had any idea that certain little groups of cells, glands that send their secretions directly into the blood, had any great influence on our bodies and minds. To-day we know that these glands may determine whether we are normally intelligent people or idiots, peaceful or quarrelsome, highly-strung and nervous or calm and placid.

These special tissues used to be called "ductless glands" because the "chemical messengers" (secretions called *hormones*) are collected directly by the blood flowing through the tissue—they do not flow out from the gland through a special pipe or "duct" in the usual way. Now, however, we know that among the glands which have ducts to carry away some of their secretions (their *external* secretions) there are some which produce in addition secretions which are collected directly by the blood from the gland tissue: in order to include these, too, it is better to speak of *all* the glands which make "chemical messengers" as *the glands of internal secretion*. The word *hormones* means "things which set in action." They can be compared to little keys flowing along in the blood until they find the right lock; each lock has its own special key and no other will do, and they must unlock the right door before they can deliver their message.

Good health and normal growth and development of body and mind depend upon the proper working of these glands, which work together like the musicians playing in an orchestra. The violin cannot take the part of the piano, but each is necessary for the proper rendering of the music.

We do not yet know all about what

these glands can do, but what we do know is most interesting, and important, too, as we are able to use the knowledge in the treatment of certain diseases. Here we can mention only a few of the remarkable achievements of some of the glands.

What the Glands do.

The thyroid, which is in front of your neck and can be felt moving up and down when you swallow, can be compared to the accelerator of a car, because its hormone regulates the rate at which the body engine works. If the thyroid produces too much secretion, the engine " races " and uses up its fuel and repair material too quickly, and the body fires burn wastefully. If there is too little of the thyroid hormone, the engine only just " ticks over " and it doesn't provide enough power for the body and mind to work properly; the body fires are sluggish and we become dull-witted and listless.

A baby whose thyroid did not produce enough hormone would not grow and develop normally, and would be quite unable to learn lessons like an ordinary child of the same age. One of the greatest triumphs of medical science is to be able to cure this form of mental deficiency in a child or adult by giving a medicine containing some of the precious hormone obtained from the healthy gland of an animal. Another gland (the pituitary), which is about the size of a pea, makes at least two powerful hormones. One of these controls the growth of your bones, determining whether you shall be a giant or a dwarf or just of normal size; another acts on certain muscle tissue, including the muscle in the walls of the blood pipes, causing it to contract or " tighten up," and this of course affects your " blood pressure."

Two other glands (the adrenals) make a hormone that prepares you to deal with emergencies, to protect yourself by fighting or running away. An extra supply of this hormone is poured into the blood during excitement or fear or any other emotion. It makes the heart beat more powerfully and releases extra fuel (sugar) into the circulation to provide for a greater output of energy; it makes you think and act more quickly and increases your muscular strength.

The pancreas is an example of a gland which has an external secretion (the digestive juice that flows through its duct into the small bowel), *and* an internal secretion or hormone. This pancreatic hormone controls the use of sugar by the body; and when the hormone is deficient or absent (as in certain diseases of the pancreas) there is too much sugar in the blood and some drains away through the kidneys. This is the condition known as diabetes and the new insulin treatment is the use of an extract of pancreas which contains this hormone.

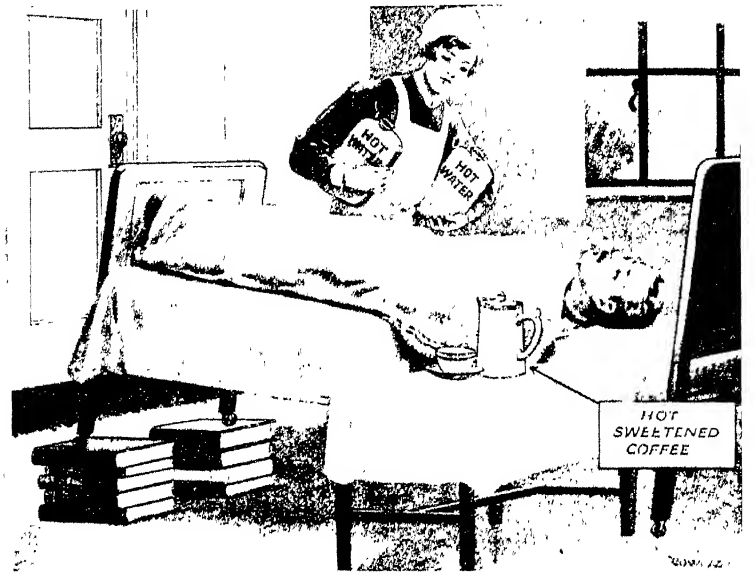
Health and Disease.

So far we have talked about the body in health; but the body has enemies—and, sad to say, we ourselves are often our bodies' *worst* enemies. We may neglect the body's needs of fresh air, exercise, proper food (well chewed and eaten at meal-times only), rest, cleanliness inside and out, and we may poison it with too much alcohol or tea.

We are surrounded by enemy germs which will cause disease; they are everywhere, but the body has its defences. Your white cells are ever ready to slaughter off invaders, and they are a very formidable army; yet the body does not rely upon them alone. Many germs cause their damage by making poisons; your body is able to make antidotes—substances which will render the poisons quite harmless to you. In addition to this, the body is able to create other substances, which make the germs more easily conquerable by your white cells.

To keep yourself free from disease, keep your body fit, so that its three means of defence may be as effective as possible.

FIRST AID IN ACCIDENT OR ILLNESS



Specially drawn for this work.

TREATMENT FOR SHOCK

A condition of *shock* is a common effect of serious accidents, injuries and burns, and it is most important to know how to treat it, as a patient may die from shock. Here you see the essential *rest*, *warmth* and *stimulants* provided. The foot of the bed is raised to improve the circulation of blood to the vital centres of the brain.

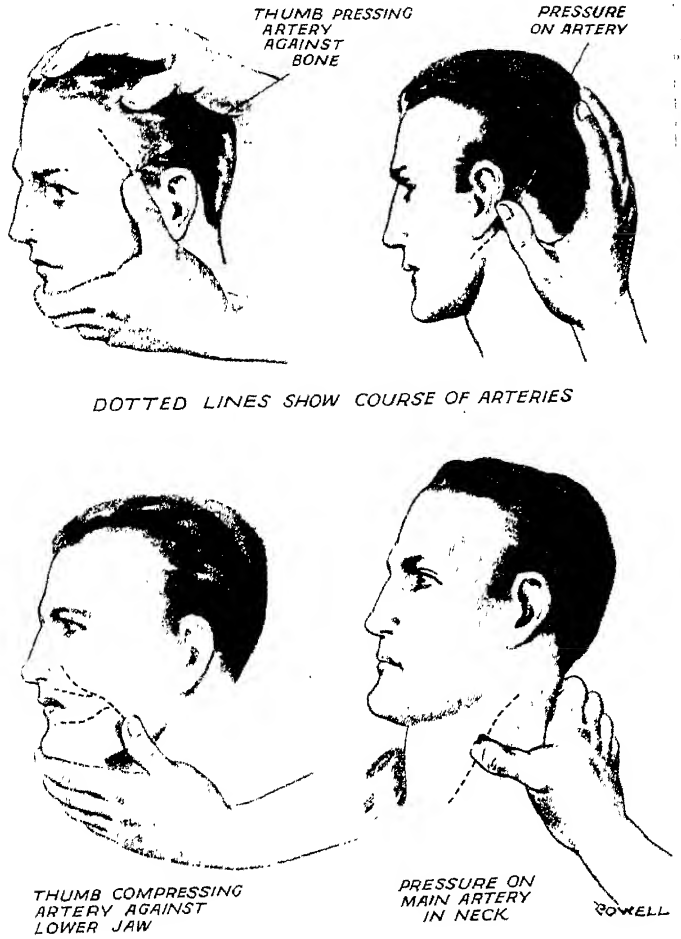
TO give "first aid" means to give immediate help to anyone suffering from injury or sudden illness, such as a broken arm or a burn or a fainting fit, until the arrival of a doctor. The right kind of help given at the right time is most valuable, but you cannot give this help unless you have learnt what the correct treatment should be. In serious cases, such as poisoning or a broken bone, or severe bleeding, send a message for the doctor without delay, stating the nature of the trouble if possible. Then do the best you can for the patient until the doctor arrives.

What to do for Shock.

After an accident or poisoning, or even after great emotion, the patient may suffer from "shock." He will be very pale, his skin cold and clammy, his breathing irregular and quick, and his heart-beat weak and rapid. You can feel the heart-beat in the pulse at the wrist by placing your finger tips at the base of the thumb in front. The normal pulse rate in health is about 70, but in a condition of severe shock it may be as high as 140. A patient in this condition will be only half conscious, with pinched face and sunken eyes.

Anyone suffering from shock needs *absolute rest* (lying down with the legs and hips raised above the level of the head), *warmth* and *hot fluids* to drink. If you cannot get him into bed at once, cover with coats, rugs or any extra

PRESSURE POINTS FOR CONTROL OF BLEEDING



Specially drawn for this work.

To control bleeding effectively—whether you are using your thumb or a pad and bandage or a tourniquet—you should know the most suitable places to apply the pressure to the artery which is carrying blood to the bleeding point. Where arteries are lying deep, surrounded by soft structures, it would be most difficult if not impossible to apply sufficient pressure without injury. The best pressure points are where the artery lies near the surface and close to bone against which it can be compressed. Ambulance workers must know these points.

clothing available, and keep him lying flat, with pads (cushions or rolled clothing) to raise the hips and lower limbs. As soon as possible, he should be placed between warm blankets in bed, and the foot of the bed should be raised about a foot by supporting the ends of the bed on blocks of wood or piles of books. Provide hot-water bottles, and as soon as the patient can swallow, give hot fluids. Water alone is better than nothing, but if you can get hot sweetened tea or coffee, so much the better. Do not give brandy or whisky or wine.

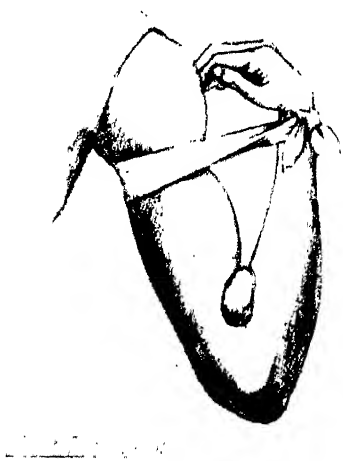
How to Make a Person Vomit.

In some cases of poisoning you must empty the stomach as soon as possible, to get rid of any of the poison that is still in the stomach. Sometimes you can cause vomiting by *tickling the back of the throat* with a finger or some other object, such as a feather or a piece of paper. If this method fails, and the patient can swallow, you should *give an emetic* (an emetic is something which causes vomiting).

Mustard dissolved in a tumbler of warm water—one teaspoonful for a small child up to a tablespoonful for a grown-up.

Salt dissolved in a tumbler of warm water– two teaspoonfuls for a child up to two tablespoonfuls for an adult.

Warning. Never give an emetic when the person has taken some poison which leaves stains or burns on the lips, mouth or fingers.



Specially drawn for this work.

BLEEDING ARRESTED BY PRESSURE AT A JOINT

Here you see compression of the blood-vessels at the elbow by a pad held in position by keeping the arm flexed. The pad must be pushed up close to the joint.

Stimulants.

In some cases where the heart is feeble, you will be advised to give a stimulant, which is something that makes the heart work better. Any of the following will do :—

Strong tea or coffee with sugar ; give a cupful.

Brandy or whisky ; a teaspoonful for a child, up to a tablespoonful for an adult, in water.

Strong beef tea, a cupful.

Sal volatile, ten drops for a small child up to a teaspoonful for an adult, in a tablespoonful of water.

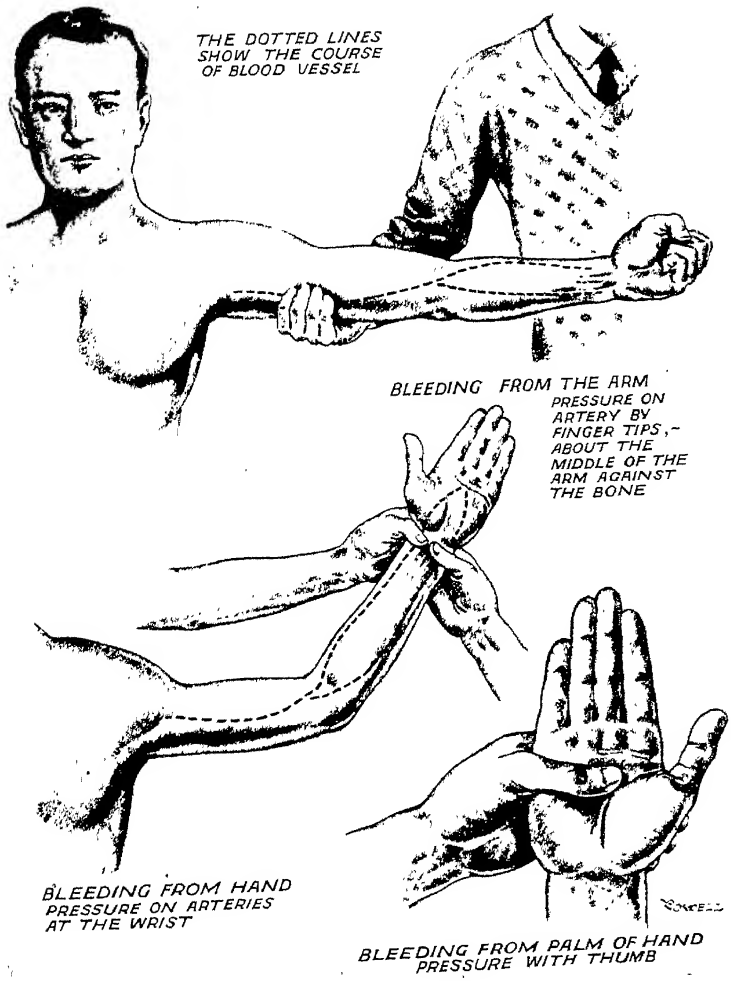
Artificial Respiration (see Drowning).

Bites.

For a *dog bite,* pour iodine on the wound, or wash it in water containing an antiseptic such as Milton, Izal, Monsol, etc. If the dog is ill, or has a dirty mouth, the doctor may have to give special treatment ; so consult him without delay, and try to trace the dog.

For a *snake* (adder) *bite,* tie a handkerchief tightly round the limb between the bite and the heart ; for instance, if the bite is on the foot, tie the handkerchief tightly round the leg. Keep the limb hanging down, and try to make the wound bleed by scraping or pricking it with a penknife or other sharp object. You can remove some of the

BLEEDING FROM THE ARM OR HAND



Specially drawn for this work.

Bleeding from the arm can be controlled by pressure on the pressure point, either with the fingers (as illustrated), or with pad and bandage, or with a tourniquet. Pressure at the wrist, to control bleeding from the hand, must be applied to both the wrist arteries, as shown in the diagram, since these arteries join to form an arch in the palm of the hand, and if one only were compressed, blood would still be carried to the wound by the other.

poison by sucking the wound: the poison is harmless when taken into the mouth, provided you have no sore places through which it could get into your blood.

Give a stimulant (brandy, tea or coffee), and, if breathing stops, do artificial respiration (see under "Drowning").

Bleeding.

A little bleeding, such as occurs from a slight cut on the finger or knee, will do no harm; it will be checked naturally in due course by the clotting of the blood. If, however, the blood is flowing freely, either in spurts from a cut artery or in a steady trickle from a cut vein, then you should try to check the bleeding without delay.

Bleeding can be stopped by pressure, either directly on the wound itself or on the main blood-vessel [artery] leading to the wound. You can exert pressure on the wound with the finger or thumb, preferably through a pad made from a clean handkerchief. If an antiseptic, such as iodine, is available, dip your fingers or the pressure pad into it before touching the wound. You may be unable to keep up the pressure in this way long enough to stop the bleeding permanently. If possible, therefore, get the patient himself, or another helper, to check the bleeding temporarily in this way while you prepare a bandage. This may be used either to keep a thick pad in position over the wound or to tie round the limb so as to press on the blood-vessel carrying blood to the wound.

The pressure is needed at certain points between the heart and the injury, called "pressure points," where the blood-vessel can be squeezed flat against bone. The diagrams show you the main pressure points of the body. If you are using a bandage to check the bleeding, put some firm object, such as a smooth pebble or a flat cork, in a fold of the bandage immediately over the pressure point, and, having tied the bandage round the limb loosely, push a stick through the knot and tighten the bandage, just enough to check the bleeding, by twisting the stick. This type of bandage is called a *tourniquet*. The pressure must be released by untwisting the stick every quarter of an hour, if the tourniquet cannot be removed before that time.

Bleeding from the Nose.

In most cases no treatment is necessary; but if the bleeding is profuse and keeps on, the bridge of the nose should be bathed with cold water (ice water if available), and a cold-water pad should be placed on the back of the neck. Other ways of stopping the bleeding are either plugging the nostrils with cotton wool soaked in lemon juice or peroxide of hydrogen, or pressing the nostrils together between thumb and finger. The patient should sit up with head thrown back and breathe through the mouth. If ice is available, give him a piece to suck.

Bleeding from the Socket of an Extracted Tooth.

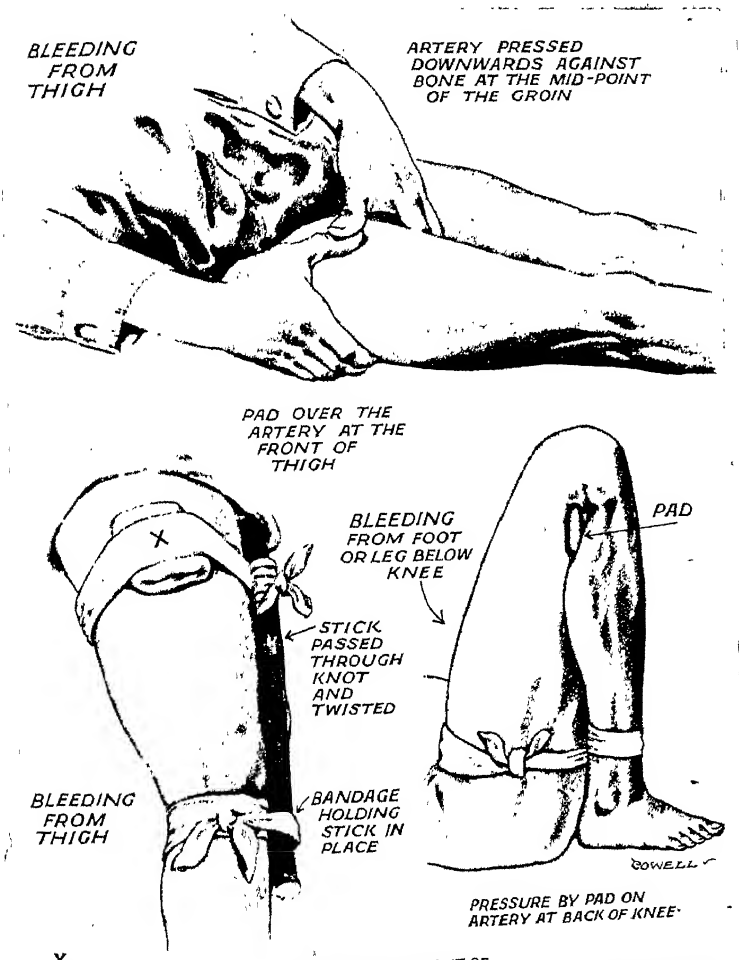
Plug the hole with cotton wool soaked in lemon juice or peroxide of hydrogen, or some other disinfectant, place a pad (a small folded handkerchief will do) over it, and tell the patient to bite on it, so as to press the plug firmly into the socket.

Burns and Scalds.

If clothing catches fire, without a moment's delay smother the flames by wrapping over the burning part any clothes or rugs on which you can lay your hands; and prevent the person from running about. It is usually best to place him on the floor, with the burning clothes uppermost, and then roll him in rugs, blanket, shawl, tablecloth or anything else available, and keep him tightly wrapped until the flames are smothered.

If an acid or caustic fluid is spilled on

BLEEDING FROM THE LEG OR FOOT



Specially drawn for this work.

In a case of bleeding from the thigh, the patient or another helper can compress the artery with the thumbs, as illustrated above, while you prepare a tourniquet. To control bleeding from the foot or leg below the knee, the arteries behind the knee can be compressed by a pad held in position by fixing the limb as shown.

the skin, drench the part immediately with water; then, in the case of acid, apply an alkali, such as milk of magnesia or washing soda solution, but for a burn from a caustic alkali put on weak vinegar and water, or lemon juice and water. Then dress the burn in the usual way.

To Dress a Burn.—If the skin is not broken, cover the burn with any antiseptic oil or ointment, or powder it with bicarbonate of soda (baking soda).

If the skin is broken, take care not to break any blisters, and do not pull off any pieces of clothing that may be stuck on the wound. Cut away clothing that cannot be removed easily, and cut round any parts that are stuck down. If the burn is on a part that can be immersed in a bowl of warm water containing a teaspoonful of boric powder to each pint (temperature between 98° and 99° F.), soak the part in this warm bath; it will lessen the pain and shock, and will loosen the bits of clothing that are stuck down. Keep adding a little hot water to prevent the solution from cooling.

To dress the burn, use picric acid if you have any. Cover the wound in strips of gauze or butter muslin soaked in picric acid solution. If you have no picric acid, soak the gauze in olive and eucalyptus oil. Let the doctor see the burn as soon as possible.

Shock from Burns. The most serious effect of a bad burn, especially in babies and young children, is the condition of shock which is caused by the burn. Treat the shock (see p. 404).

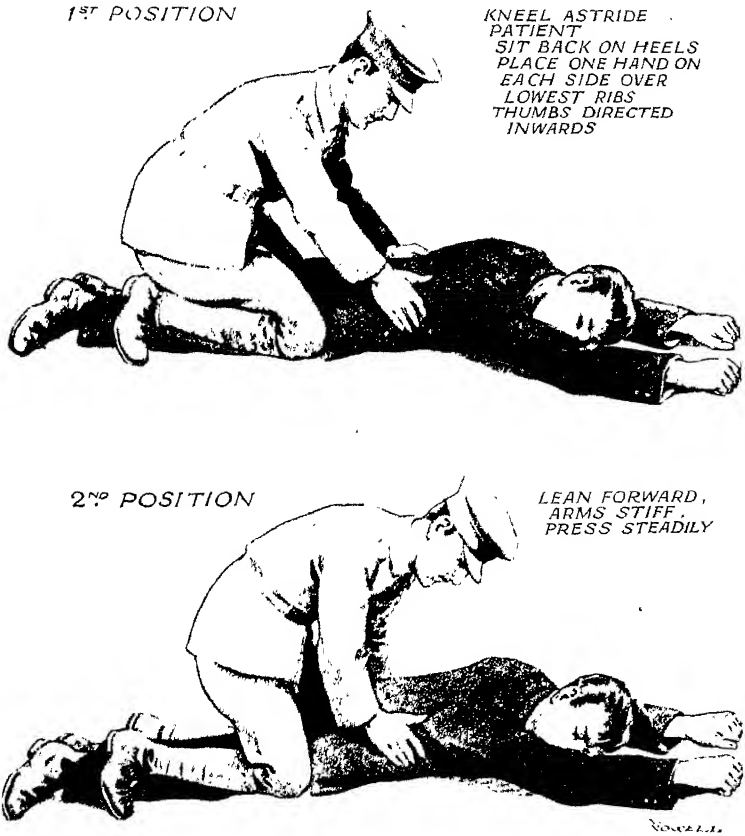


Specially drawn for this work.

NOSE BLEEDING

A little bleeding from the nose will do no harm whatever, and may actually do good. Only if the bleeding is very profuse and shows no tendency to diminish is treatment required. Here you see sponges soaked in ice-cold water being applied to the bridge of the nose and the nape of the neck, while the patient sits upright.

ARTIFICIAL RESPIRATION



Specially drawn for this work.

Here you see Schäfer's method illustrated. The chest is being alternately compressed and allowed to expand, so that air will be drawn into the lungs and then forced out again. Thus the natural movements of breathing are imitated. Clear the mouth and throat of weeds or any other obstruction before you begin. The patient must be carefully watched for some time after natural breathing has started, as it may again cease, in which case artificial respiration must be resumed without delay.

Concussion. See Head Injury.

Drowning.

Anyone who has been under water for a period may appear to be dead when taken out of the water, but may recover if breathing can be started again. Attempts to do this, known as *artificial respiration*, should be started as soon as possible after clearing the mouth of any obstruction such as weeds, etc., and loosening the clothing at the neck and chest; and the artificial respiration should be carried on for two or three hours if necessary. If other help is available, *send for a doctor at once*, and arrange for blankets, hot-water bottles, hot tea or coffee.

Artificial Respiration.—You must try to reproduce the natural movements of the patient's chest when deep breathing. Place the patient in the position shown in the picture—head turned to one side and arms extended—and kneel so that you can place your hands over the lower ribs. Now compress the chest as much as you can, to drive out the air (and any water that may have got into the lungs). You will do this best if you throw the weight of your body forward as you squeeze the chest, keeping your arms quite still. Then remove the pressure by raising your body and arms slowly; this lets the patient's chest expand again, and air is drawn in through the nose. You are thus forcing the patient to breathe, squeezing air out of the chest and allowing air to enter again by letting the chest expand. Do the movements slowly, to imitate the normal rate of breathing. If other helpers are present, take turns, changing over when you are tired.

As soon as the patient is breathing normally, remove the wet clothing and wrap him in warm blankets, with hot-water bottles, and put him to bed as soon as possible. Give stimulants (hot sweetened tea or coffee, etc.) only *after* natural breathing has started.

The treatment of the apparently drowned, then, is in two stages:—

(1) Artificial respiration, started immediately and continued for two or three hours if necessary.

(2) Warmth and stimulants after natural breathing has started.

Ear.

Beads, peas, pencil ends, etc., are sometimes pushed into the ear by children. At the bottom of the ear passage there is a very delicate structure, the drum of the ear, which may easily be torn by unskilled attempts to remove the object. Therefore, unless the object is protruding so that you can get hold of it easily, do not try to remove it. Nor should you syringe the ear. Consult the doctor.

Eye.

Bits of *dust or grit* may blow into the eye. *The eye should on no account be rubbed.* If you can see the speck lying under the lid or on the eyeball, very gently try to remove it with a wisp of cotton wool or the corner of a clean handkerchief, or a camel's hair brush. If it appears to be stuck in the surface put a drop of oil (castor or olive oil) into the eye, cover with a soft pad and bandage, and leave it for the doctor to attend to. Where the particle is embedded in the eye, there may be much less pain than when it is lying loosely on the surface, but there is a likelihood of germs getting into the eye and causing serious trouble. A doctor should be consulted as soon as possible.

If some *chemical irritant*, such as acid, ammonia or quicklime, splashes into the eye, without a moment's delay the lids should be opened and shut several times *under water*. The injured person can put his face into a basin of water to do this. After the eye has been thoroughly bathed, put in a drop of castor oil and cover with pad and bandage. Consult a doctor as soon as possible.

A "*black eye*" is really a bruise. It should be treated by cold bathing; and a pad of lint or a folded handkerchief soaked in cold water (ice water if

available) should be bandaged over the eye.

Cuts or wounds about the eyelids may be bathed with plain warm water; do not use an antiseptic unless the doctor orders this.

Fainting.

A person who faints becomes unconscious because the brain is not getting enough blood, owing to the heart beating too feebly to pump sufficient blood up to the head.

Keep the patient lying down, with the head lower than the body if possible, so that blood can flow more easily into the brain. Give stimulants—smelling salts held to the nose and cold water sprinkled on the face, and brandy or sal volatile as soon as the patient can swallow. Don't let people crowd round, as the patient should have as much fresh air as possible. Loosen clothing at the neck and chest. A cup of hot sweetened tea or coffee should be given when the patient is recovering.

Fits.

A *fit* ("*convulsion*") *in a baby* or young child may occur quite suddenly; the eyes become fixed, the face purple, and the limbs and body stiff, and the child becomes unconscious. Send for the doctor. Meanwhile, place the child on a couch or bed and loosen or remove the clothing. Apply cold cloths to the head, and as soon as possible put the child into a warm bath, continuing to bathe the head with cold water.

A "*stroke*" or apoplectic fit in elderly people may cause a sudden collapse in the street. The face becomes deeply flushed, and the patient breathes noisily, or snores. There is loss of power [paralysis] in one or more limbs, and when the patient recovers consciousness, he may be unable to move his limbs. Send for a doctor at once. Keep the patient lying down, loosen the clothing and give plenty of air. *Do not give stimulants.*

An epileptic fit may occur during childhood, middle or old age. There is a sudden fall, often preceded by a shrill cry. There is gnashing of teeth and irregular movements of the arms and legs. The patient foams at the mouth and he may bite his tongue, causing bleeding.

The treatment of an epileptic fit is to protect the patient from injuring himself. Put something (a pencil, handle of teaspoon or piece of wood wrapped in a handkerchief) between the teeth to prevent biting of the tongue. Pull any furniture, etc., out of the way so that he shall not bruise himself during the convulsions, and protect him from fire. *Give nothing by the mouth.* Allow him to sleep when the fit is over, covering him with a rug or coat.

A hysterical fit is not serious, and the patient is not at all likely to hurt herself. She is very noisy, screaming or laughing or crying alternately, and she may throw her limbs about wildly, and even foam at the mouth. Do not show sympathy or appear particularly interested. Speak sharply to her, and throw cold water in the face if she does not control herself. The patient should see a doctor later, as hysteria is a sign of ill-health; it is not "just pretending." At the same time, the best way to help her during the fit is to appear unconcerned; any show of sympathy will make her more violent.

Fractures.

If the limb appears bent or in an unnatural position, and there is loss of power and great pain on movement, or if you have heard the snap of the breaking bone, you must get a doctor as soon as possible; and, if the patient is away from home, arrange for an ambulance or other conveyance if he is unable to walk. If he must be removed before he is attended to by a doctor, gently move the affected limb into a natural position, and make a splint from walking sticks, umbrellas, rolled newspapers, or any other suitable object which is sufficiently rigid to

protect the broken bone. If there is no wound, the splint can be put on over the clothing; but if the skin is broken, you should cut the clothing if you cannot remove it easily, and dress the wound before putting on the splints. The splints should be well padded; they can be tied on with handkerchiefs.

Remember that if you have to straighten the limb to put on the splints, move the limb very gently and *never pull on it.*

Frost Bite.

If your fingers, ears or nose become white and deadened with the cold, so that you have no feeling in them, *do not allow them to become warm suddenly.* Gently rub the parts with snow or cold water, and then *gradually* warm them with your hands or some part of your body. Do not go into a warm room until the parts have thawed and normal colour has returned.

Head Injury.

A fall or a blow on the head may cause *concussion.* The patient looks very pale, and may vomit; he usually becomes drowsy, or he may be actually unconscious. The treatment is *quiet, rest and sleep.* Put him to bed in a darkened room, put cold cloths on his head, and send for the doctor.

If there is bleeding from the mouth, nose or ears, or if unconsciousness persists, there may be a fracture of the skull and serious *compression* of the brain. Treat as for concussion, but send an urgent message for a doctor.

Heat Stroke.

A patient who is exhausted by prolonged exposure to heat suffers from severe shock; he becomes pale and cold and may become unconscious. Treat as for shock.

Nose.

Bleeding from the Nose.—See under "Bleeding."

Button, Bead, Pea, etc., in the Nose.—Children sometimes push objects up the nostrils and are unable to remove them. Let the child blow his nose vigorously, and let him smell pepper or snuff to make him sneeze; if you know which side is blocked, compress the free nostril with the finger. If this treatment fails to dislodge the object, *make no attempt to remove it yourself.* Take the child to a doctor.

If the object has been in the nose for some days before the child has confessed to putting it there, there may be a thick yellow blood-stained discharge.

Poisoning.

Poisons act in different ways, and the treatment varies according to the type of poison which has been taken.

Corrosive poisons eat into and destroy the parts with which they come into contact, so that the lips and mouth are stained and burnt; and although we cannot see into the food-pipe and stomach, we know that they are similarly corroded. Therefore, in these cases, we must *never give anything to make the person sick,* because the injured lining of the food-pipe and stomach would probably tear with the movements of vomiting. Examples of corrosives are spirits of salt (hydrochloric), or of vitriol (sulphuric acid), carbolic acid, salts of lemon (oxalic acid), spirit of hartshorn (ammonia), quick-lime, caustic potash, caustic soda.

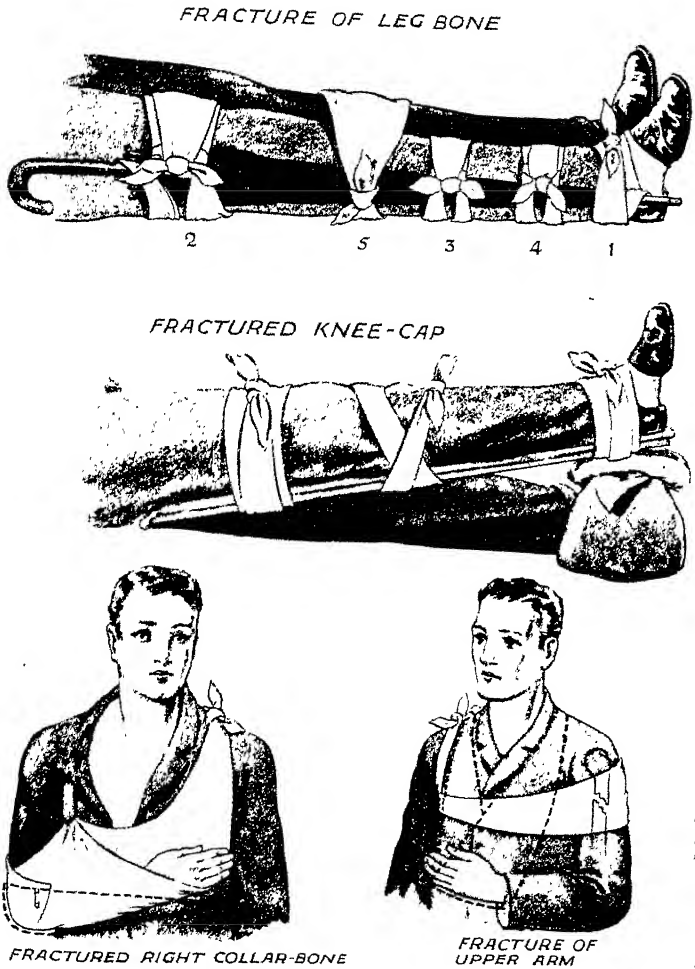
Irritant poisons cause inflammation of the stomach and bowel, but they are not so destructive as the corrosives. In cases of irritant poisons, we do give emetics to empty the stomach of the poison by making the patient vomit.

Narcotics act upon the nervous system, causing such symptoms as delirium, convulsions and unconsciousness.

Some poisons are both irritant and narcotic.

Treatment.—(1) *Send for the doctor* immediately, explaining that you suspect poisoning, and naming the poison if known.

FIRST AID FOR BROKEN BONES



Specially drawn for this work.

Your aim is to keep the bone in a natural position with a bandage and sling, or by the use of a rigid support—a splint—which can be tied in place with handkerchiefs, mufflers, or any strips of material. The splint should be well padded so that it could not injure the soft parts. Splints can be made from walking sticks, umbrellas, the branch of a tree, or a cricket bat, hockey stick or golf stick. The numbers in the top picture show the order in which the bandages should be fixed.

Note.—Save any vomited matter, or motions passed from the bowel, or bottles, glasses, etc., that have contained the poison.

(2) If the lips and mouth are not burnt, and you have no reason to suspect a corrosive poison, *make the patient vomit* as soon as possible (see p. 406).

(3) If you know what poison has been taken, give something to make it harmless. We call this neutralising the poison, and the substance which does this is called the *antidote*.

Note.—The following list gives the antidotes for some common poisons :—

Poison.	*Antidote.*
Corrosive acids	Chalk or whitening, milk of magnesia, lime water.
Corrosive alkalis	Vinegar, lemon juice.
Carbolic acid, creosote, turpentine	Epsom salts.
Opium, morphia, laudanum	Condy's fluid, solution of potassium permanganate.
Strychnine, foxglove	Strong stewed tea.

(4) *Treat the Symptoms.*—Stimulants and warmth for shock.

Artificial respiration if breathing has ceased or is failing.

Keep the patient awake if he is very drowsy.

Soothe the sore throat, stomach and bowel by giving raw eggs beaten in milk, or plain milk, or flour and water.

For pain in the stomach, apply hot fomentations or hot poultices or a hot-water bottle to the stomach.

The following plants (*berries, leaves*) *are poisonous* :—

Deadly nightshade.	Henbane.
Privet.	Foxglove.
Holly.	Spotted hemlock.
Cuckoo pint.	Yellow vetchling.
Bryony.	Woody nightshade.
Laburnum.	
Laurel.	

If a child shows signs of poisoning after eating unknown berries or leaves, treat in the same way as for the listed plants—make the child vomit, give stimulants and warmth, and give a purge (dose of castor oil). Artificial respiration may be necessary.

Sprains.

Apply bandages soaked in cold water, and rest the injured joint, using splints or slings where necessary. Let a doctor see the injury as soon as possible in case there is also a broken bone.

Stings of Insects.

When the sting is left in the skin, remove it by pressing around it with the tube of a watch key or other suitable instrument.

Mosquito Bites.—Apply ammonia or sal volatile. If the skin becomes reddened [inflammation], bathe it with very hot water, or apply hot foments.

Wasp Stings.—Rub the part with a piece of wet washing-soda or the surface of a cut onion, or apply weak ammonia or sal volatile.

Bee Stings.—Apply vinegar or lemon juice.

Sunstroke.

If the head and back of the neck are exposed to the sun's rays in hot weather, high temperature, giddiness, weakness and sickness may result and be followed by drowsiness or unconsciousness.

Treatment.—Take the patient to a cool, shady place, and remove his clothing. Douche the head, neck and spine with cold water or wrap him in sheets soaked in cold water, or put him into a cold bath.

When he has recovered consciousness, and the temperature has fallen to 102° F., put him to bed between blankets, and keep the room darkened. If he again becomes unconscious, renew the cold applications, and if breathing ceases, do artificial respiration. Give water to drink (*not stimulants*).

